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ACCOUNTS AND PAPERS:

FORTY-EIGHT VOLUMES.

—*(6.)*—

ARMY.

MEDICAL DEPARTMENT.

Session

5 *February* —— 28 *July* 1863.

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1863.

FORTY-EIGHT VOLUMES:—CONTENTS OF THE

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ARMY:

Army Medical Department:

Statistical, Sanitary, and Medical Report of the Army Medica Department, for the Year 1861 - - - - - p. 1

ARMY MEDICAL DEPARTMENT.

STATISTICAL,

SANITARY, AND MEDICAL

REPORTS

FOR THE YEAR

1861.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED BY HARRISON AND SONS,
FOR HER MAJESTY'S STATIONERY OFFICE.

1863.

LONDON:
PRINTED BY HARRISON AND SONS
FOR HER MAJESTY'S STATIONERY OFFICE.

TO THE RIGHT HONOURABLE

THE SECRETARY OF STATE FOR WAR.

My Lord,

In accordance with instructions laid down for the conduct of business by the Director-General and Heads of Branches of the Army Medical Department, I have the honour to submit the accompanying Reports on the Health of the Army in 1861, and on various matters connected with the duties of the Officers of the Department.

I have the honour to be,

My Lord,

Your Lordship's most obedient

Humble Servant,

J. B. GIBSON,

Director-General.

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STATISTICAL REPORT

ON THE

HEALTH OF THE ARMY IN 1861.

BY

T. GRAHAM BALFOUR, M.D., F.R.S.

DEPUTY INSPECTOR-GENERAL OF HOSPITALS, AND HEAD OF THE STATISTICAL BRANCH.

ERRATA IN REPORT FOR 1860.

Page 28, from 26th to 58th Regiments, *dele* 2nd Battalion.
„ „ „ 76th to 96th „ „ 4th „
„ 69, last line in table, for 1159 *read* 1859.
„ 152, Appendix No. III, *transpose* Depôt Brigade, R.A., *and* Depôt Battalions.

TO THE DIRECTOR-GENERAL

OF THE

ARMY MEDICAL DEPARTMENT.

Sir,

I have the honour to submit the Statistical Report on the Health of the Army for 1861.

In consequence of the Annual Returns from Bengal not having been received, it has been necessary to prepare the Report on the Health of the Troops in that Presidency from the Quarterly Returns.

In addition to the usual details respecting the Health of the Army at Home and Abroad, some information has been given in the present Report on the subject of the health of soldiers on board ship, while proceeding to or returning from foreign service.

I have the honour to be,

Sir,

Your most obedient humble servant,

T. GRAHAM BALFOUR,
Deputy Inspector-General.

6, *Whitehall Yard,*
May 1863.

STATISTICAL REPORT FOR 1861.

I.—ON THE HEALTH OF THE TROOPS SERVING IN THE UNITED KINGDOM, IN 1861.

Section I.

Sickness and Mortality

United Kingdo

The weekly sick returns of the troops serving throughout the United Kingdom in 1861, show the average strength of non-commissioned officers and men from the 29th of December, 1860, to the 27th December, 1861, inclusive, to have been 88,955, the admissions into hospital among them to have been 91,220, the deaths from all causes, both in and out of hospital, 822, and the average number constantly sick, 4,852. Of the deaths, 138 occurred when the men were absent from their corps. These numbers give the following proportions per 1000 of mean strength, and the results for 1860 have been added to the Table for the purpose of comparison —:

	Ratio per 1,000 of Mean Strength.		
	Admitted into Hospital.	Died.	Constantly Sick.
1861	1,025	9·24	54·54
1860	1,053	9·95	54·72

Thus it appears that, in 1861, there has been a slight reduction in all these particulars.

The following Table shows the number of admissions and deaths occasioned by each of the principal classes of diseases, and their relative proportion in 1860 :—

Orders.	Average Strength, 88,955.	Admitted into Hospital	Died.			Ratio per 1,000 of Mean Strength.			
						1861.		1860.	
			With the Regiment.	Absent from the Regiment.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	19,674	75	12	87	221·2	·98	246·2	1·23
2	Enthetic „ ..	31,476	12	2	14	353·8	·16	369·0	·08
3	Dietic „ ..	629	3	..	3	7·1	·03	5·5	·10
4	Parasitic „ ..	3,122	..	..	..	35·1	..	30·2	·02
	Class II.								
1	Diathetic Diseases ..	211	9	5	14	2·4	·16	1·8	·12
2	Tubercular „ ..	1,665	237	60	297	18·7	3·34	17·8	3·47
	Class III. Diseases of the—								
1	Nervous system ..	1,770	61	9	70	19·9	·79	18·8	·62
2	Circulatory „ ..	916	61	9	70	10·3	·79	7·5	·72
3	Respiratory „ ..	8,731	113	15	128	98·2	1·44	106·5	1·77
4	Digestive „ ..	3,465	33	8	41	38·9	·45	36·0	·51
5	Urinary „ ..	270	7	1	8	3·	·09	2·7	·14
6	Reproductive „ ..	664	..	..	..	7·5	..	4·9	..
7	Locomotive „ ..	318	..	..	..	3·6	..	3·0	·03
8	Integumentary „ ..	10,669	3	3	6	119·9	·07	118·1	·14
	Class IV.								
4	Diseases of Nutrition..	187	3	1	4	2·1	·04	1·0	·03
	Class V.								
1	Accidents	7,118	53	8	61	80·	·68	78·5	·60
3	Homicide	4	2	..	2	} ·1	·02	} ·2	·02
4	Suicide	9	12	2	14		·16		·34
5	Execution	..	..	3	3	..	·03	..	..
6	Corporal Punishment..	181	..	..	..	2·1	..	1·9	..
	Not specified	141	..	..	..	1·6	..	3·1	·01
	Total ..	91,220	684	138	822	1025·5	9·24	1052·7	9·95

This Table shows the reduction in the admissions to have been chiefly in the classes of miasmatic and venereal diseases, and to a slight extent also in those of the respiratory system; but the leading facts of the great prevalence of venereal and high mortality by tubercular diseases, remain unchanged: the former having caused more than one-third of all the admissions, and the latter above one-third of the total deaths.

Adopting the same principle as in last Report, we have classified the stations into the following groups:—

1. Seaport Towns—comprising Devonport and Plymouth, Portsmouth, Dover, Bristol, Liverpool, Yarmouth, and Newcastle-upon-Tyne.
2. Dockyards and Arsenals—Chatham and Sheerness, Woolwich, Pembroke Dock.
3. Camps—Aldershot, Shorncliffe, Colchester, the Curragh.
4. Large Manufacturing Towns — Manchester, Sheffield, Birmingham, Preston, Glasgow, Paisley.
5. London and Windsor—The troops consisting only of the Household Cavalry and Foot Guards.
6. Dublin.
7. Stations occupied by Depôt Battalions not included in any of the preceding groups—Maidstone, Canterbury, Parkhurst, Walmer, Win-

chester, Chichester, Athlone, Birr, Belfast, Buttevant, Templemore, Limerick, Fermoy, Cork, Stirling, Aberdeen. *United Kingdo*

8. The remaining stations, chiefly small towns not comprised in the preceding groups, or large towns where only a very small detachment of troops is quartered.

The following Table shows the admissions into hospital and deaths in each of these groups during the year, and the number of men who died while absent from their corps :—

	Average Strength.	Admitted into Hospital.	Died.	Average constantly Sick.
1. Seaport Towns	11,744	13,237	105	701
2. Dockyards and Arsenals	11,838	14,744	126	804
3. Camps	24,753	23,356	153	1,269
4. Large Manufacturing Towns ..	3,832	3,835	31	180
5. London and Windsor (Household Troops)	5,757	4,858	54	302
6. Dublin	4,899	5,025	32	287
7. Stations of Depôt Battalions not included in preceding groups ..	16,175	16,742	116	883
8. Remaining Stations	9,957	9,423	66	426
9. Detached from their Corps ..	..	..	138	..
Total ..	88,955	91,220	822	4,852

On reducing these numbers to the ratio per 1,000 of strength, for the purpose of comparison with similar data in the Report for 1860, the following results are obtained :—

Ratio per 1,000 of Strength.	1861.			1860.		
	Admitted into Hospital.	Died.	Constantly Sick.	Admitted into Hospital.	Died.	Constantly Sick.
1. Seaport Towns	1127	8·94	59·69	1034	9·84	55·29
2. Dockyards and Arsenals ..	1245	10·64	67·92	1332	10·48	69·02
3. Camps	944	6·19	51·27	941	7·57	51·82
4. Large Manufacturing Towns	1001	8·01	46·97	1025	8·40	49·68
5. London and Windsor (Household Troops) ..	844	9·38	52·46	774	7·44	49·78
6. Dublin	1026	6·74	58·58	983	7·37	54·02
7. Stations of Depôt Battalions not included in preceding groups	1035	7·17	54·59	1123	12·37	57·85
8. Remaining Stations ..	946	6·63	42·78	1085	8·01	43·62
Total, including men detached from their Corps	1025	9·24	54·54	1053	9·95	54·72

This Table shows an increase in the admissions at the Seaport Towns, London, and Dublin, and a decrease in all the other groups, except the Camps, which remain at the same amount.

The improvement in the Dockyards and Arsenals has been chiefly at Chatham and Sheerness, where the admissions amounted to 1,305 per 1,000, against 1,498 in the preceding year ; there was also a reduction at Pembroke Dock ; but the proportion at Woolwich remained unchanged.

The increase in the Seaport Towns has been most marked at Devonport and Dover, and has also been considerable at Portsmouth.

The admissions into hospital and deaths at each group of stations, by the different classes of diseases, are shown in the following Table :—

Orders.	Groups of Stations ..	Seaports.		Dockyards and Arsenals.		Camps.		Manufacturing Towns.		London and Windsor.		Dublin.		Depôt Battalions.		Remaining Stations.	
	Average Strength ..	11,744		11,838		24,753		3,832		5,757		4,899		16,175		9,957	
	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.																
1	Miasmatic Diseases ..	2,513	16	3,281	8	4,704	23	823	1	1,052	3	1,117	3	4,034	12	2,120	8
2	Enthetic „ ..	5,464	3	4,212	4	8,880	..	1,345	..	1,660	..	1,781	1	4,942	3	3,192	1
3	Dietic „ ..	139	1	78	..	130	1	43	..	27	..	23	1	114	..	75	..
4	Parasitic „ ..	590	..	653	..	714	..	101	..	229	..	45	..	604	..	186	..
	Class II.																
1	Diathetic Diseases ..	37	1	32	..	54	1	9	..	15	1	14	1	32	3	18	2
2	Tubercular „ ..	192	33	355	52	375	55	55	8	120	16	79	5	379	50	119	17
	Class III.																
	Diseases of the—																
1	Nervous system ..	218	8	374	10	407	13	76	3	61	9	70	4	369	9	195	6
2	Circulatory „ ..	78	8	273	4	171	23	17	3	16	6	43	7	248	8	70	2
3	Respiratory „ ..	1,055	16	1,880	30	1,812	19	285	9	456	11	634	7	1,825	12	784	9
4	Digestive „ ..	410	7	628	4	913	4	127	1	212	1	137	3	693	9	345	6
5	Urinary „ ..	45	..	49	2	60	1	6	..	10	2	11	..	69	1	20	..
6	Reproductive „ ..	104	..	88	..	220	..	16	..	13	..	59	..	89	..	75	..
7	Locomotive „ ..	38	..	64	..	89	..	9	..	13	..	16	..	55	..	34	..
8	Integumentary „ ..	1,252	..	1,633	2	2,859	..	556	..	557	..	603	..	2,099	..	1,110	1
	Class IV.																
4	Diseases of Nutrition ..	47	..	49	2	38	..	3	..	6	..	6	..	34	1	4	..
	Class V.																
1	Accidents	986	9	1,020	7	1,861	10	350	3	393	4	373	1	1,086	5	1,049	14
3	Homicide	..	1	..	..	3	1	1	..	..	..	..	..	2	..	..	..
4	Suicide	3	2	1	1	1	2	..	3	1	1	..	..	..	3	1	..
6	Corporal punishment ..	26	..	29	..	42	..	11	..	6	..	11	..	38	..	18	..
	Diseases not stated ..	10	..	45	..	23	..	2	..	11	..	3	..	39	..	8	..
	Total	13,237	105	14,744	126	23,356	153	3,835	31	4,858	54	5,025	33	16,742	116	9,423	66

Ratio per 1,000 of Mean Strength.

Orders.	Groups of Stations ..	Seaports.		Dockyards and Arsenals.		Camps.		Manufacturing Towns.		London and Windsor.		Dublin.		Depôt Battalions.		Remaining Stations.	
	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.																
1	Miasmatic Diseases ..	216·49	1·36	277·15	·68	190·04	·93	214·77	·26	182·73	·52	228·01	·61	249·40	·74	212·92	·80
2	Enthetic „ ..	465·22	·25	355·81	·34	358·74	..	350·18	..	288·35	..	363·57	·21	305·53	·19	320·58	·10
3	Dietic „ ..	11·83	·09	6·59	..	5·25	·04	11·22	..	4·69	..	4·69	·21	7·05	..	7·53	..
4	Parasitic „ ..	50·23	..	55·16	..	28·84	..	26·35	..	39·78	..	9·19	..	37·34	..	18·68	..
	Class II.																
1	Diathetic Diseases ..	3·15	·09	2·70	..	2·18	·04	3·34	..	2·61	·17	2·86	·21	1·98	·19	1·81	·20
2	Tubercular „ ..	16·35	2·80	29·99	4·39	15·15	2·22	14·35	2·09	20·84	2·78	16·13	1·02	22·88	3·09	11·95	1·71
	Class III. Diseases of the—																
1	Nervous system ..	18·56	·68	31·59	·84	16·44	·53	19·83	·78	10·60	1·56	14·29	·81	22·81	·56	19·59	·60
2	Circulatory „ ..	6·64	·68	23·06	·34	6·91	·93	4·43	·78	2·78	1·04	8·78	1·42	15·33	·49	7·03	·20
3	Respiratory „ ..	89·83	1·36	158·81	2·53	73·20	·77	74·37	2·35	79·21	1·91	129·41	1·42	112·83	·74	78·74	·90
4	Digestive „ ..	34·91	·60	53·05	·34	36·89	·16	33·14	·26	36·82	·17	27·97	·61	42·84	·56	34·65	·60
5	Urinary „ ..	3·83	..	4·14	·17	2·42	·04	1·56	..	1·74	·35	2·25	..	4·27	·06	2·01	..
6	Reproductive „ ..	8·85	..	7·43	..	8·89	..	4·17	..	2·26	..	12·04	..	5·50	..	7·53	..
7	Locomotive „ ..	3·24	..	5·41	..	3·60	..	2·34	..	2·26	..	3·27	..	3·40	..	3·42	..
8	Integumentary „ ..	106·60	..	137·94	·17	115·50	..	145·09	..	96·75	..	123·09	..	129·77	..	111·48	·10
	Class IV.																
4	Diseases of Nutrition ..	4·00	..	4·14	·17	1·54	..	·78	..	1·04	..	1·22	..	2·10	·06	·40	..
	Class V.																
1	Accidents	83·95	·77	86·16	·59	75·18	·40	91·33	·78	68·26	·70	76·14	·21	67·14	·30	105·35	1·41
3	Homicide	..	·09	..	..	·12	·04	·26	..	..	..	..	..	..	..	..	..
4	Suicide	·26	·17	·08	·08	·04	·08	..	·78	·17	·17	..	..	·12	·19	·10	..
6	Corporal punishment ..	2·21	..	2·45	..	1·70	..	2·87	..	1·04	..	2·24	..	2·35	..	1·81	..
	Diseases not stated ..	·85	..	3·80	..	·93	..	·52	..	1·91	..	·61	..	2·41	..	·80	..
	Total	1127·00	8·94	1245·46	10·64	943·56	6·18	1000·90	8·08	843·84	9·37	1025·76	6·73	1035·05	7·17	946·38	6·62

United Kingdom.

MIASMATIC DISEASES.—On subdividing this class of diseases as in previous Reports, the following results are obtained :—

		Annual Ratio per 1,000 of Mean Strength.							
		Seaport Towns.	Dockyards and Arsenals.	Camps.	Manufacturing Towns.	London and Windsor (Household Troops).	Dublin.	Depôt Battalion Stations.	Remaining Stations.
Eruptive Fevers ..	Admitted	3·1	2·6	1·9	1·6	6·9	1·8	4·4	2·6
	Died ..	·17	..	·08	..	·17	..	·06	·20
Paroxysmal Fevers ..	Admitted	19·1	14·8	4·7	6·3	6·2	22·9	9·	8·8
	Died ..	·08	..	..	..	..	..	·12	..
Continued Fevers ..	Admitted	23·6	30·	21·5	37·6	21·5	30·8	25·6	20·3
	Died ..	·77	·25	·65	..	·17	·41	·37	·50
Dysentery, Diarrhœa, and Cholera	Admitted	26·4	34·9	17·2	25·3	21·	21·	22·3	25·
	Died ..	·17	·25	·04	..	·17	·20	·12	..
Sorethroat and Influenza	Admitted	34·	73·1	45·8	48·3	58·	29·	75·8	58·
	Died ..	..	..	·04	..	..	..	·06	..
Ophthalmia	Admitted	33·8	25·5	24·3	29·	11·8	67·2	40·6	22·5
	Died ..	..	..	..	..	..	..	..	..
Rheumatism	Admitted	54·9	72·2	58·4	39·4	44·3	47·8	56·6	46·6
	Died ..	·08	..	·08	·26	..	..	..	·10

Eruptive Fevers show a decrease at all the groups of stations compared with the results of 1860. Of 51 cases of small-pox, 23 occurred at Seaport Towns, 12 at Stations of Depôt Battalions, and 16 were distributed among the other groups ; 14 of the cases were at Devonport and Plymouth, 8 at Dover, and 8 at Limerick. Seventy-five cases of scarlet fever are recorded, but the disease does not appear to have assumed the form of an epidemic, except among the recruits of the Brigade of Guards at Croydon, where 20 cases occurred between the 5th of April and the 10th of May in a strength of 282 men. Measles prevailed to a considerable extent among the soldiers' children at several stations during the year ; but although cases occurred occasionally among the men, the disease cannot be said to have affected them epidemically. It was reported in the early part of the year to be epidemic among the children at Shorncliffe and Hythe, Aldershot, Athlone, Templemore, and Dublin, and at a later period at Sheerness, Canterbury, Edinburgh, the Curragh and Newbridge, Fermoy, Limerick, and Mullingar. Though thus wide-spread among the children, it occasioned only 118 admissions and one death among the men. The fatal case occurred at Walmer, where the disease was not at the time prevalent.

Paroxysmal Fevers have been much lower in the Dockyards and Arsenals than in 1860, a result which seems to justify the opinion then expressed, that the ratio in that year was "unusually high at Woolwich, in consequence of a considerable number of men who had taken their discharge from the Honourable East India Company's Army, having, on their return to England, enlisted into the Artillery."

The ratio of admissions in the group of Seaport Towns has been raised above the previous average, in consequence of several regiments arriving from India and forming part of the garrisons ; these corps furnished a large proportion of the cases of intermittent fever, the liability to which had been contracted during their previous service. The increased proportion in Dublin has arisen from a similar cause—the arrival of the 87th Regiment from China.

Continued Fevers have not differed materially in their amount.

Dysentery and Diarrhœa.—The excess in the admissions by these diseases in the Seaport Towns has probably been due to the same cause as that of the paroxysmal fevers.

Sorethroat and Influenza have been much less prevalent than in 1860, except among the troops in London. The difference has been most marked in the Dockyards and Arsenals. *United Kingdom.*

Ophthalmia. — The very great increase in the amount of ophthalmia in Dublin was entirely due to the arrival in June of the 87th Regiment from China, after a passage of six months, during the latter part of which ophthalmia had been very prevalent. Upwards of half of the admissions in Dublin by this disease were from that Corps. The precaution of sending all the men affected to Arklow and Drogheda, as soon as they were convalescent, proved successful in arresting the progress of the disease in a very short time. The slight excess in the amount of ophthalmia in the Seaport and Manufacturing Towns occurred chiefly in regiments just returned from abroad, where they had suffered from the disease.

Enthetic Diseases.—The admissions on account of venereal diseases continue very high, exceeding in number one-third of the strength. There has been a slight increase in the proportion in the Seaport Towns, Camps, and at London and Windsor, and a decrease in all the other groups of stations, but particularly at Dublin, the Dockyards and Arsenals, and the "Remaining Stations."

The following Table shows the admissions per 1,000 of mean strength by these diseases at each of the large stations, compared with the results of 1860 :—

	1861.	1860.		1861.	1860.
Manchester	487	289	Cork	354	346
Portsmouth	485	503	Chatham and Sheerness	328	351
Plymouth and Devonport	470	440	Shorncliffe	325	327
Belfast	469	413	Birr	309	268
Colchester	415	430	Parkhurst, Isle of Wight	295	304
Dover	401	383	Pembroke Dock	261	228
Woolwich	399	473	Edinburgh	260	300
Canterbury	397	290	Preston	209	411
Winchester	380	408	Fermoy	195	268
The Curragh	364	373	London and Windsor — Household Cavalry	135	97
Dublin	363	409	London and Windsor — Foot Guards	328	255
Aldershot	361	339			
Limerick	360	401			

The admissions into hospital by this class of diseases have amounted to 354 per 1,000 of the strength. The number constantly in hospital with them has been 23·45 per 1,000, and the average duration of the cases 24·19 days. The inefficiency caused by it has therefore been equal to the loss of the services of every soldier at home for 8·56 days, being a trifle under the amount in the preceding year.

On dividing the venereal diseases into two groups, syphilitic and gonorrhœal, the following results are obtained as to their relative prevalence and duration :—

	Ratio per 1,000.		Average Duration of Cases.
	Admitted.	Constantly Sick.	
			Days.
Syphilitic	209·8	15·95	27·81
Gonorrhœal	144·	7·50	19·

Taking the principal diseases in each of these two groups separately, the average period in hospital is found to be, of primary syphilis 25·70 days; of secondary 27·73 days; of bubo 35·35 days; of gonorrhœa 18·77 days; of swelled testicle 17·80 days; and of stricture of the urethra 29·90 days.

Diseases of the Respiratory System have been more prevalent in the dockyards and arsenals and in London and Windsor than in 1860, and have prevailed to almost exactly the same extent as in that year at the seaport towns and Dublin. If, however, the admissions on account of influenza and tonsillitis, which are grouped with the miasmatic diseases, be added to this class, there will be found a marked reduction in all the groups except London and Windsor. The following summary illustrates this fact clearly :—

United Kingdom.

	Ratio per 1,000 admitted for Diseases of the Respiratory System, Influenza, and Tonsillitis.						
	Seaport Towns.	Dockyards and Arsenals.	Camps.	Manufacturing Towns.	London and Windsor.	Dublin.	Depôt Battalion Stations.
1861 ..	124	232	119	123	137	158	189
1860 ..	143	284	139	165	130	183	216

This Table, therefore, shows a decrease in the admissions by these diseases, except among the Household Troops at London and Windsor, where there has been a slight increase. It also shows the much greater prevalence of these affections in the dockyards and arsenals than at other stations, a result probably of the greater amount of duty and consequent exposure of the men.

Violent Deaths.—These amounted in the whole force to 80, of which 61 were returned as the result of accidental causes, and 33, or upwards of half of these, by drowning. In a large proportion the casualty is returned as "drowned," or "found drowned," the special circumstances under which it occurred not being known; but 11 of the men are reported to have been bathing, and 2 to have been drowned from boats. It seems desirable, with a view to reduce the number of these fatal accidents, that wherever there are facilities for it, the men should receive instruction in swimming.

Corporal Punishment.—The extent to which this has been inflicted has varied from one per 1,000 of the strength in London and Windsor, to 2·9 per 1,000 in the large manufacturing towns.

The other classes of diseases do not seem to require special comment.

We shall now submit the usual information respecting the sickness, mortality, and invaliding in the different arms of the service. A slight deviation has been made, on the present occasion, from the rule that no regiment should be included which had not been serving at home during the whole of the year. Towards the end of December several regiments embarked for British America, and as their exclusion would have materially reduced the field of observation, while no error of any importance could arise from their being included, the latter course was adopted, care being taken to make the necessary deduction from the strength of each corps for the period between its embarkation and the 31st of December. In other respects the following Table has been prepared in the same manner as in previous Reports.

	Average Strength.	Admitted into Hospital.	Died in and out of Hospital.	Discharged as Invalids.	Annual Ratio per 1,000 of Strength.			1859-60. Annual Ratio per 1,000.		1860. Ratio per 1,000.
					Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Household Cavalry .	1,219	684	12	10	561	9·84	8·2	526	5·74	14·72
Dragoon Guards and Dragoons	9,528	9,238	62	448	970	6·51	47·0	953	6·98	22·77
Royal Artillery* ..	10,021	10,130	75	*	1,011	7·48	*	1,041	7·85	..
Royal Engineers ..	2,042	..	20	..	..	9·79	..	1,256	5·25	..
Military Train ..	1,817	1,678	14	70	923	7·70	38·5	1,198	7·15	21·72
Foot Guards	5,811	4,612	52	164	794	8·95	28·2	774	9·28	24·65
Infantry Regiments .	26,719	22,677	205	935	849	7·67	35·0	930	8·92	21·30
Cavalry Depôts ..	1,101	1,481	8	120	1,345	7·27	109·0	1,325	11·32	9·61
Depôt Brigade, Royal Artillery*	3,314	4,498	34	281	1,357	10·26	21·1	1,302	12·56	20·20
Depôt Battalions ..	21,970	20,652	249	1,753	940	11·33	79·8	1,117	14·31	21·65

* The greater number of the invalids from the Royal Artillery are discharged at

This Table shows a slight increase in the admissions into hospital of the Cavalry, Foot Guards, the Cavalry Depôts, and the Depôt Brigade Royal Artillery; but a decrease in the Royal Artillery, Military Train, Infantry Regiments, and Depôt Battalions, compared with the average of the two preceding years. The mortality is below the previous average in all arms except the Household Cavalry and Military Train, and from the limited number of men in these corps fluctuations in the ratio may be naturally expected. *United Kingdom.*

The mortality in the Depôt Battalions and Depôt Brigade Royal Artillery has been, as formerly, considerably in excess of the other arms of the Service. That this is in a great measure the result of the large proportion of men serving in them whose constitutions have been deteriorated by previous service, many of them having been sent home to the Depôts for change of climate, appears to be borne out by the fact that in a strength of 15,299 men under 25 years of age, in the Depôt Battalions, 115 deaths occurred, while in 6,671 men above that age, the deaths amounted to 134, or in the respective proportions of 7·52 and 20·09 per 1,000 of the strength. A corresponding difference is found to exist in the Depôt Brigade Royal Artillery.

As in former Reports, for the sake of accuracy of comparison, the ratio of mortality has been calculated in the following Table on the same proportion of men at different periods of life in each arm, the numbers serving in the Dragoon Guards and Dragoons in 1861 being taken as the standard, and the results of previous years being reduced to it.

Ratio of Deaths per 1,000 living in	1861.	1859-60.	1860.
Household Cavalry	5·76	4·73	..
Dragoon Guards and Dragoons	6·51	7·33	..
Royal Artillery	6·97	..	9·63
Military Train	9·33	8·29	..
Foot Guards	7·76	9·07	..
Infantry Regiments	7·36	9·02	..
Cavalry Depôts	7·00	..	10·01
Depôt Brigade Royal Artillery	13·83	..	15·23
Depôt Battalions	11·38	14·70	..
Civil Male Population of healthy districts in England and Wales	7·41		
Ditto ditto of England and Wales generally	8·85		

This shows the mortality to have been lower than in the most healthy districts of England in the Cavalry, Artillery, and Infantry Regiments, and higher in the Military Train, Foot Guards, Depôt Brigade of Artillery, and the Depôt Battalions. But it must not be forgotten that this is wholly irrespective of the diseased lives eliminated from the ranks of the Army by the process of invaliding.

The invaliding in all the arms, except the Household Cavalry, has been higher than in 1860, and this may, perhaps, account for the lower rate of the mortality. It must not, however, be concluded that the higher ratio of invaliding necessarily implies a greater amount of inefficiency in the different arms of the Service. The strength of the army having been raised above the authorised establishment it became necessary to reduce it. For this purpose recruiting was for a time suspended, and the opportunity was taken to discharge a number of the least efficient men who, although under ordinary circumstances they would have continued to serve, were for this reason included among the invalids. As this did not affect the Household Cavalry, the Foot Guards, or the Royal Artillery, there is no corresponding increase in the number of invalids from them.

With a view to estimate the influence of this increase in the invaliding upon the mortality of the different arms, we have obtained from the War Office a return of the number of men placed on the pension list during the

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Woolwich, and appear in the return of the Depôt Brigade. The ratio per 1,000 is therefore calculated upon 13,335, the average strength of the corps serving at home.

United Kingdom.

year from each of the Corps included in the preceding Table, and the deaths among these pensioners between the period of their discharge and the 31st of December. For the purpose of accurately comparing the mortality of the two years, similar information has been obtained regarding the various Corps included in the Report for 1860, and the whole reduced to the following tabular form. It must be remembered, however, that these numbers include all the men discharged with a pension whether for disability or length of service, and do not include men discharged for disability who had no claim to pension, the mortality among whom there are no means of tracing.

	Placed on the Pension List during the Year 1861.	Of whom there Died before 31st December, 1861.	Placed on the Pension List during the Year 1860.	Of whom there Died before 31st December, 1860.
Household Cavalry	28	1	44	1
Dragoon Guards and Dragoons ..	402	20	214	7
Royal Artillery	137	3	150	2
Military Train	49	..	31	2
Foot Guards	187	20	180	12
Infantry Regiments	2,032	46	900	29

It may be fairly presumed that any mortality among these men in excess of the ordinary rate was the result of disease contracted in the service, and their deaths should consequently be included in any calculation of the mortality among the troops As, however, the men when discharged were struck off the strength of their corps, a correction must be made also in the strength. The invaliding being distributed over the whole year, the reduction caused by it in the average strength of the troops for that time would be equal to half the numbers discharged, and this addition has accordingly been made in the following Table:—

	1861.			1860.		
	Average Strength corrected as above.	Deaths of Soldiers and Pensioners.	Ratio of Deaths per 1,000 of Strength.	Average Strength corrected as above.	Deaths of Soldiers and Pensioners.	Ratio of Deaths per 1,000 of Strength.
Household Cavalry ..	1,233	13	10·54	1,245	5	4·02
Cavalry of the Line ..	9,729	82	8·43	8,803	60	6·82
Royal Artillery	10,090	78	7·73	11,799	94	7·97
Military Train	1,841	14	7·60	1,673	15	8·97
Foot Guards	5,905	72	12·19	5,891	67	11·37
Infantry Regiments ..	27,735	78	9·05	25,567	279	10·91

This Table shows an increase in 1861 in the mortality of the Cavalry and Foot Guards, and a decrease in that of the Artillery, Military Train, and Infantry Regiments. The rate of mortality is highest in the Foot Guards, and it may, therefore, be presumed that the invaliding from them, though less in amount than from the other arms, except the Household Cavalry and the Artillery, as shown in Table, p. 12, was on account of disabilities of a more serious nature.

The following Table, compiled from Abstract No. I. of Appendix, shows the admissions, deaths, and discharges by invaliding caused by each of the principal classes of diseases.

Orders.		Household Cavalry.			Cavalry.			Royal Artillery.			Military Train.			Foot Guards.			Infantry Regiments.			Cavalry Depôts.			Depôt Brigade, Royal Artillery.			Infantry Depôt Battalions.		
	Strength	1,219			9,528			10,021			1,817			5,811			26,719			1,101			3,314			21,970		
		Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
	Class I.																											
1	Miasmatic Diseases	145	..	..	2,085	8	60	1,678	7	16	279	2	13	935	6	10	4,593	23	161	376	..	27	892	2		4,962	25	331
2	Enthetic „	171	..	..	3,192	1	21	4,144	..	23	701	..	4	1,723	..	8	8,165	3	33	377	1	7	1,450	2		5,824	2	59
3	Dietic „	3	..	..	50	..	..	44	..	..	8	..	..	25	..	..	143	1	3	6	..	..	15	..		151	..	..
4	Parasitic „	10	..	..	163	..	..	277	..	2	43	..	..	195	..	..	703	..	2	14	..	..	229	..		924	..	5
	Class II.																											
1	Diathetic Diseases	5	..	..	18	2	3	33	..	..	9	..	..	14	1	1	58	5	3	3	..	..	3	..		37	4	6
2	Tubercular „	10	6	3	125	23	93	179	25	79	37	5	20	135	14	91	393	72	160	18	4	11	140	19		446	115	279
	Class III. Diseases of the—																											
1	Nervous System	5	2	3	161	6	49	167	5	44	37	2	5	61	11	13	432	14	110	38	..	15	149	1		480	22	197
2	Circulatory „	1	..	..	56	6	58	62	9	26	16	..	6	21	5	7	207	18	126	17	1	17	65	1		396	16	242
3	Respiratory „	76	3	1	565	11	28	680	14	12	110	4	5	423	8	19	2,336	31	133	155	1	1	462	4		2,597	30	236
4	Digestive „	50	..	2	271	1	47	296	2	27	55	..	11	172	1	..	951	12	53	83	1	19	168	..		898	10	148
5	Urinary „	3	..	..	16	..	7	7	..	7	3	..	..	5	2	..	76	2	9	7	..	4	13	..		77	5	19
6	Reproductive „	6	..	..	105	..	9	134	..	4	25	..	2	15	..	..	220	..	12	22	..	..	32	..		74	..	3
7	Locomotive „	..	..	..	31	..	12	43	..	12	1	..	..	13	..	1	88	..	42	1	..	2	24	..		82	1	46
8	Integumentary „	105	..	..	1,350	..	21	1,219	..	5	180	..	1	507	..	8	2,598	..	28	228	..	3	474	2		2,409	2	53
	Class IV.																											
4	Diseases of Nutrition	..	..	1	3	..	8	28	..	..	1	..	..	..	..	..	46	..	24	1	..	8	39	..		53	1	63
	Class V.																											
1	Accidents	90	1	..	1,027	4	32	1,101	9	24	165	1	3	356	2	6	1,613	16	33	132	..	6	342	3		1,153	15	58
3	Homicide	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	..	..	..	..	..	..		..	..	..
4	Suicide	..	..	..	..	..	..	1	4	..	..	..	..	1	2	..	5	3	..	..	..	..	..	..		1	1	..
5	Execution	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..		..	..	..
6	Corporal Punishment	..	..	..	20	..	..	37	..	..	8	..	..	6	..	..	41	..	..	2	..	..	1	..		51	..	..
	Diseases not specified	4	..	..	..	..	..	..	..	..	..	..	..	5	..	..	8	..	3	..	..	..	..	..		37	..	8
	Total	684	12	10	9,238	62	448	10,130	75	281	1,678	14	70	4,612	52	164	22,677	205	935	1,481	8	120	4,498	34	..	20,652	249	1753

Included in col. 3, Royal Artillery.

Ratio per 1,000 of Mean Strength.

Orders.		Household Cavalry.			Cavalry.			Royal Artillery.			Military Train.			Foot Guards.			Infantry Regiments.			Cavalry Depôts.			Depôt Brig. Royal Artillery.		Infantry. Depôt Battalions.		
		Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Admitted.	Died.	Invalided.
	Class I.																										
1	Miasmatic Diseases ..	119·0	..	..	218·8	·84	6·30	167·5	·70	1·26	153·5	1·10	7·16	160·9	1·03	1·72	171·9	·86	6·05	341·5	..	24·52	269·2	·60	225·8	1·14	15·07
2	Enthetic „ ..	140·3	..	..	335·0	·10	2·21	413·5	..	1·72	385·5	..	2·20	296·5	..	1·37	305·6	·11	1·24	342·4	.91	6·36	437 6	·60	265 0	·09	2·69
3	Dietic „ ..	2·5	..	..	5·3	..	..	4·4	..	..	4·4	..	..	4·3	..	..	5·4	·04	·11	5·4	..	..	4·5	..	6·9	..	..
4	Parasitic „ ..	8·2	..	..	17·1	..	..	27·6	..	·15	23·7	..	..	33·6	..	..	26·3	..	·07	12·7	..	..	69·1	..	42·1	..	·23
	Class II.																										
1	Diathetic Diseases ..	4·1	..	..	1·9	·21	·31	3·3	..	..	4·9	..	..	2·4	·17	·17	2·2	·19	·11	2·7	..	..	·9	..	1·7	·18	·27
2	Tubercular „ ..	8·2	4·92	2·46	13·1	2·42	9·76	17·9	2·49	5·92	20·4	2·75	11·00	23·2	2·41	15·66	14·7	2·69	5·99	16·4	3·63	9·99	42·2	5·74	20·3	5·23	12·69
	Class III. Diseases of the—																										
1	Nervous System ..	4·1	1·64	2·46	16·9	·63	5·14	16·7	·50	3·29	20·4	1·10	2·75	10·5	1·89	2·24	16·2	·52	4·12	34·5	..	13·63	45·0	·30	21·9	1·00	8·97
2	Circulatory „ ..	·8	..	..	5·9	·63	6 09	6·2	·90	1·95	8·8	..	3·30	3·6	·85	1·21	7·7	·67	4·72	15·4	·91	15 45	19·6	·30	18·0	·73	11·02
3	Respiratory „ ..	62·3	2·46	·82	59·3	1·16	2·94	67·9	1·39	·89	60·6	2·20	2·75	72·8	1·37	3·27	87·4	1·16	4·98	140·8	·91	·91	139·4	1·21	118·2	1·36	10·75
4	Digestive „ ..	41·0	..	1·64	28·4	·10	4·93	29·5	·20	2·02	30·3	..	6·06	29 6	·17	..	35·6	45	1·98	75·4	·91	17·26	50·7	..	40·9	·45	6·74
5	Urinary „ ..	2·5	..	..	1·7	..	·73	·7	..	·52	1·7	..	..	·8	·35	..	2·8	·08	·33	6·4	..	3·63	3·9	..	3·5	·23	·86
6	Reproductive „ ..	4·9	..	..	11·0	..	·94	13 4	..	·3)	13·8	..	1·10	2·6	..	..	8·2	..	·44	20·0	..	..	9·7	..	3·4	..	·14
7	Locomotive „ ..	..	..	..	3·3	..	1·26	4·3	..	·89	·5	..	..	2·2	..	·17	3·3	..	1·57	·9	..	1·82	7·2	..	3·3	·05	2·09
8	Integumentary „ ..	86·1	..	..	141·7	..	2·21	121·6	..	·37	99·1	..	·55	87·2	..	1·37	97·3	..	1·04	207·1	..	2·72	143·0	·60	109·6	·09	2 41
	Class IV.																										
4	Diseases of Nutrition ..	..	..	·82	·3	..	·84	2·8	..	..	·5	..	..	..	..	..	1·7	..	·89	·9	..	7·26	11·8	..	2·4	·05	2·87
	Class V.																										
1	Accidents	73·8	·82	..	107·8	·42	3·36	109·8	·90	1·79	90·8	·55	1·65	61·3	·35	1·04	60·4	·60	1·24	120·8	..	5·44	103·2	·91	52·5	·68	2·63
3	Homicide	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·04	·08	..	..	..	..	..	..	..	..	..
4	Suicide	..	..	..	..	..	..	·1	·40	..	..	..	..	·2	·35	..	·2	·11	..	..	..	..	..	..	·04	·05	..
5	Execution	..	..	..	..	..	..	..	..	..	4·4	..	..	..	..	..	..	·11	..	..	..	..	..	..	..	..	..
6	Corporal Punishment ..	..	..	..	2·1	..	..	3·7	..	..	..	..	..	1·0	..	..	1·5	..	..	1·8	..	·3	..	..	2·3	..	..
	Diseases not specified ..	3·3	..	..	..	..	..	..	..	..	..	..	..	·8	..	..	·3	..	·11	..	..	..	..	..	1·7	..	·36
	Total	561·1	9·84	8·20	969 6	6 51	47·02	1010·9	7·48	21·07	923·5	7·70	38·52	793·5	8·95	28·22	848 7	7·67	34·99	1345·1	7·27	108·99	1357·3	10·26	940·0	11·33	79·79

MIASMATIC DISEASES furnish the following results when subdivided into groups as in previous Reports:— *United Kingdom.*

		Annual Ratio per 1,000 of Mean Strength.								
		Household Cavalry.	Dragoon Guards and Dragoons.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Brigade, Royal Artillery.	Depôt Battalions.
Eruptive Fevers	Admitted	..	1·36	2·39	·56	3·79	3·07	2·73	3·02	2·69
	Died	..	·10	·20	..	·17	·08	..	..	·05
Paroxysmal Fevers	Admitted	·82	3·57	6·09	..	1·20	4·68	9·99	18·70	10·01
	Died	..	..	..	..	..	..	..	..	·05
Continued Fevers	Admitted	5·74	27·08	12·38	20·36	29·77	19·24	36·33	18·70	25·40
	Died	..	·53	·50	·55	·52	·60	..	·30	·64
Dysentery, Diarrhœa, and Cholera	Admitted	26·26	26·87	22·56	11·01	20·99	14·41	51·77	32·89	25·40
	Died	..	..	..	·55	·17	·08	..	..	·18
Sorethroat and Influenza	Admitted	30·36	66·44	41·71	31·92	44·92	38·81	82·66	78·76	63·77
	Died	..	·10	..	..	·17	..	..	..	·05
Ophthalmia	Admitted	·82	11·54	17·36	11·01	10·67	28·56	43·59	19·62	40·56
	Died	..	..	..	..	..	..	..	..	..
Rheumatism	Admitted	44·29	56·46	50·39	69·89	42·16	49·52	91·73	76·95	50·11
	Died	..	..	..	..	..	·08	..	·30	·09

United Kingdom.

On comparing these with the ratios of 1860, a marked reduction will be found in the admissions by *Eruptive Fevers* in the Household Cavalry, Foot Guards, and Depôt Battalions, and in *Paroxysmal Fevers* in the Royal Artillery and Depôt Battalions.

Continued Fevers have been much less prevalent in the Household Cavalry, Military Train, Depôt Brigade Royal Artillery, and the Depôt Battalions, while there has been a marked increase in the Dragoon Guards and Dragoons, the 3rd, 13th, and 14th Hussars, and 5th Dragoon Guards being the regiments which furnished the highest numbers of cases. In the 13th Hussars 78 cases of continued fever were treated, being in the ratio of 128 per 1,000 of the strength. The cases were all mild, and yielded readily to treatment; but no reason is assigned by the Surgeon of the regiment for the great prevalence of the disease.

Dysentery, Diarrhœa, and Cholera, were more prevalent than in the preceding year in the Household Cavalry, Dragoon Guards and Dragoons, and Depôt Brigade Royal Artillery; but there was a reduction in their amount in the Royal Artillery and Military Train.

In the beginning of March a sudden outburst of diarrhœa occurred in the 3rd Hussars at Dundalk, accompanied in many of the cases with vomiting and febrile symptoms, and was attributed by the Surgeon of the regiment to the use of some stale or imperfectly-cured fish which the men had procured. Between the night of the 6th and morning of the 8th there were 26 men attacked. The cases all did well, and the necessary measures having been taken to prevent the use of the unwholesome food the disease immediately ceased.

Sorethroat (Tonsillitis) *and Influenza* show a higher ratio in the Cavalry, Artillery, and Depôt Brigade of Artillery, and a lower in the Military Train, Cavalry Depôts, and Depôt Battalions, while the Foot Guards and Infantry Regiments differ but little from the previous results. If, however, the admissions from *Bronchitis*, the prevalence of which appears to be influenced by the same exciting causes, be added to those from *Tonsillitis* and *Influenza*, there will be found a reduction in all classes of troops, except the Household Cavalry, the Dragoon Guards and Dragoons, and the Depôt Brigade Royal Artillery, in which there has been an increase. The following Table shows this more clearly:—

	Ratio of Admissions per 1,000 of Mean Strength by *Tonsillitis, Influenza*, and *Bronchitis*.								
	Household Cavalry.	Dragoon Guards and Dragoons.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Brigade Royal Artillery.	Infantry Depôts.
In 1860	65	101	120	173	116	139	234	159	214
1861	86	117	98	84	108	118	208	198	169

Ophthalmia.—The admissions on this account have been only half as numerous in the Depôt Brigade of the Royal Artillery as in 1860. In the other arms the difference scarcely seems to require notice.

Enthetic Diseases.—Except in the Household Cavalry and Foot Guards, in which the admissions slightly exceed the ratio in 1860, these diseases have been less prevalent in all the arms. The invaliding on account of venereal has been 1·85 per 1,000 of the strength.

Tubercular Diseases.—The mortality by these has been very high in the Household Cavalry; but this can only be considered as an accidental fluctuation arising from the small numbers under observation. Omitting these troops and the depôts, in which the results are greatly affected by the number of men sent home for change of climate from abroad, the proportion of deaths by tubercular diseases is remarkable for its uniformity in all the arms, ranging between 2·41 per 1,000 in the Cavalry of the Line and the Foot Guards, and

2·75 in the Military Train. But it is in diseases of this class that the effect of invaliding in reducing the mortality must be most strikingly seen. In estimating their influence, therefore, on the different arms, a correct conclusion can only be arrived at by combining the mortality and invaliding. This has, accordingly, been done in the following Table :— *United Kingdom.*

	Ratio of Decrease by Deaths and Invaliding from Tubercular Diseases per 1,000 of Mean Strength.				
	Cavalry of the Line.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.
1861	12·18	8·41	13·75	18·07	8·68
1860	8·75	8·29	9·66	15·68	6·88

This shows the total loss to the service by these diseases to have been twice as great in the Foot Guards as in the Artillery or Infantry of the Line ; and compared with the Cavalry and Military Train, to have been in the proportion of three to two, a result which confirms the remark already made as to the more serious character of the diseases which occasioned the invaliding in the Guards.

Diseases of the Nervous System have been less prevalent than in 1860 in the Household Cavalry and the Depôt Battalions; the reduction in the latter has been chiefly in cases of epilepsy and headache. There has been an increase in the amount of admissions in the Cavalry of the Line and the Depôt Brigade Royal Artillery ; in the former chiefly in cases of headache and inflammation of the ear (*otitis*) ; and in the latter in cases of amentia, epilepsy, and inflammation of the ear. Two-thirds of the deaths by this class have been caused by apoplexy and paralysis. If the admissions by these two diseases be combined, their relative prevalence in the different arms will be found to be as follows :—

By Apoplexy and Paralysis.	Annual Ratio per 1,000 of Mean Strength.								
	Household Cavalry.	Cavalry of the Line.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Brigade Royal Artillery.	Depôt Battalions.
Admitted	1·64	2·31	1·90	·55	2·41	1·39	2·72	4·53	2·14
Died	·82	·63	·30	·55	1·20	·37	..	·30	·64

From this Table it appears that the admissions by these diseases have been relatively very high in the Depôt Brigade Royal Artillery, but the mortality by them has been under that of Troops of the Line.

Delirium tremens has given rise to fewer admissions than in the preceding year, and only two deaths are recorded under this head, while 12 were referred to it in 1860. Closely connected with this disease are the admissions under the head of intemperance (*ebriositas*), though arranged in a different class. They are very slightly under the former amount, but it has given rise to no deaths, whilst in 1860 it was recorded as the cause of eight. The admissions into hospital and deaths from *delirium tremens* and *ebriositas*, conjointly, were in the following proportion in the different arms :—

United Kingdom.

	Ratio per 1,000 of Mean Strength.								
	Household Cavalry.	Cavalry of the Line.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Brigade Roy. Artillery.	Depôt Battalions.
Admitted	3·28	5·88	6·39	3·85	4·47	5·65	9·08	5·74	7·74
Died	·82	..	..	..	..	..	..	..	·04

The most striking point in this Table is the high ratio of admissions in the Depôts by these diseases, the direct result of drinking, The proportion of admissions in the Royal Artillery is also very high.

Diseases of the Respiratory System.—The admissions into hospital by this class of diseases have been much lower than in 1860 among all the troops except the Household Cavalry and the Depôt Brigade Royal Artillery, in the former of which the ratio remains the same, and in the latter is higher. The reduction has been chiefly in the cases of bronchitis, and has not extended to inflammation of the lungs and pleurisy, except in the Infantry Regiments and Depôt Battalions.

Diseases of the Integumentary System present the same peculiarity as last year of the higher proportion of boils, abscesses, and ulcers in the Cavalry than the Infantry, the Artillery holding an intermediate position in that respect.

Accidents.—Drowning still continues the cause of the greater proportion of casualties under this head.

Suicide has been of less frequent occurrence than formerly. Four deaths are reported in the Artillery, two in the Guards, three in the Infantry Regiments, and one in the Depôt Battalions. Three were committed by means of firearms, two by cutting throat, one by drowning, three by poison, and one by hanging. In 1860 there were 26 self-inflicted deaths.

Corporal Punishment has given rise to fewer admissions than in 1860. There were none in the Household Cavalry, and in the other arms the proportion ranged between ·3 in the Depôt Brigade Royal Artillery and 4·4 in the Military Train.

The other classes of diseases do not seem to call for special remark.

The following Table shows the sickness, mortality, and invaliding in each of the corps, from the returns of which the preceding Tables have been compiled.

Regiments, &c.	Strength.	Admitted into Hospital.	Died.		Total Deaths.	Discharged as Invalids.	Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.			Admitted.	Died.	Invalided.	
										months
1st Life Gds.	409	189	3	1	4	4	462·1	9·78	9·78	Regent's Pk. 3 Hyde Park 9
2nd Life Gds.	403	227	4	2	6	5	563·3	14·89	12·41	Hyde Park 3 Windsor 9
R. Horse Gds.	407	268	1	1	2	1	658·5	4·91	2·46	Windsor 3 Regent's Pk. 9
	1,219	684	8	4	12	10	561·1	9·84	8·20	
4th Dr. Gds.	594	666	5	1	6	26	1121·2	10·10	43·77	Birming. &c. 8 Dublin, det. 4
5th „	598	380	5	2	7	11	635·4	11·71	18·39	Brighton, Shorncliffe 5 Aldershot 3½ Norwich, Ipswich 3½
1st Dragoons	598	447	1	1	2	35	747·5	3·34	58·52	Dublin 5 Newbridge 3½ Birmingham 3½
2nd „	591	556	2	2	4	45	940·8	6·77	76·14	Dublin 4 Edinburgh 8
3rd Hussars	594	496	4	1	5	20	835·0	8·42	33·7	Dundalk 7½ Curragh 1 Newbridge 3½
4th „	599	490	2	..	2	44	818·0	3·34	73·45	Dublin 7½ Cahir, &c. 4½
5th Lancers	602	451	3	2	5	35	749·2	8·30	58·14	Aldershot 9 Hounslow 3
9th „	588	643	5	..	5	35	1093·6	8·50	59·52	Aldershot 12
10th Hussars	601	584	2	1	3	8	971·7	4·99	13·31	Norwich, Ipswich 8 York 4
11th „	603	472	4	1	5	18	782·7	8·29	29·85	Manchester 4 Curragh 2½ Dublin 5½
12th Lancers	554	714	5	..	5	14	1288·8	9·02	25·27	York 8½ Aldershot 3½
13th Hussars	607	649	1	..	1	16	1069·2	1·65	26·36	Edinburgh 4 Manchstr. &c. 8
14th „	586	588	3	..	3	32	1003·4	5·12	54·61	Newbridge 8½ Dundalk 3½
15th „	610	771	..	..	..	65	1263·9	..	106·56	Cahir 5 Curragh 2 Dublin 5
16th Lancers	591	465	4	1	5	12	786·8	8·46	20·30	Hounslow 6 Aldershot 6
18th Hussars	612	866	2	2	4	32	1415·0	6·53	52·28	Aldershot 7½ Brighton 4½
	9,528	9,238	48	14	62	448	969·6	6·51	47·02	

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Regiments, &c.	Strength.	Admitted into Hospital.	Died.		Total Deaths.	Discharged as Invalids.	Ratio per 1,000.			Stations.	
			In Hospital.	Out of Hospital.			Admitted.	Died.	Invalided.		months.
Rl. Artillery: Horse Brigade	1,836	2,069	8	3	11	..	1126·9	5·99	..	Woolwich, Aldershot, and Ireland	
2nd Brigade	1,057	929	4	3	7	..	878·9	6·62	..	Dover and Channel Islands	
4th ,,	1,676	1,758	14	6	20	..	1048·9	11·93	..	Woolwich	8½
										Aldershot	3½
8th ,,	1,731	1,833	13	2	15	..	1058·9	8·66	..	Aldershot	9
										Dublin	3
9th ,,	1,777	1,776	5	3	8	..	999·4	4·50	..	Ireland	3
										S. E. District and Leith	9
10th ,,	1,001	863	9	1	10	..	862·1	9·99	..	Portsmth, &c.	12
15th ,,	943	902	2	2	4	..	956·5	4·44	..	Various.	
	10,021	10,130	55	20	75	..	1010·9	7·48			
Military Train 1st Battalion	300	393	..	..	..	14	1310·0	..	46·66	Aldershot	3½
										Woolwich	8½
2nd ,,	301	253	2	..	2	21	840·5	6·64	69·77	Woolwich	12
3rd ,,	293	242	1	..	1	7	825·9	3·41	23·89	Aldershot	12
4th ,,	312	252	2	..	2	..	807·7	6·41	..	Shorncliffe	5
										Aldershot	7
5th ,,	305	205	3	..	3	15	672·1	9·84	49·18	Curragh	3
										Woolwich	2
										Shorncliffe	7
6th ,,	306	333	6	..	6	13	1088·3	19·61	42·48	Woolwich	3½
										Curragh	8½
	1,817	1,678	14	..	14	70	923·5	7·70	38·52		
Gren. Gds., 1st Bat. ..	831	725	4	..	4	23	872·4	4·81	27·68	Dublin	5
										Curragh	4
										London	3
2nd Bat. ..	859	723	6	3	9	24	841·7	10·48	27·93	London	12
3rd Bat. ..	856	698	5	1	6	19	815·4	7·01	22·19	London	6
										Windsor	6
Coldm. Gds., 1st Bat. ..	858	680	7	..	7	30	792·5	8·16	34·96	London	9
										Dublin	3
2nd Bat. ..	715	538	7	2	9	26	752·4	12·59	36·36	London	12
Scots F. Gds., 1st Bat. ..	1,692	1,248	15	2	17	42	737·6	10·05	24·82	London	12
	5,811	4,612	44	8	52	164	793·7	8·95	28·22		
8th Regt., 1st Bat.	873	724	7	1	8	56	829·3	9·16	64·15	Gosport	7
										Aldershot	5
10th Regt., 1st Bat.	839	440	2	2	4	34	524·4	4·77	40·52	Aldershot	8
										Shorncliffe	4
11th Regt., 1st Bat.	850	755	7	1	8	46	888·2	9·41	54·11	Plymouth	4
										Curragh	5
										Mullingar	2½
										Dublin	½
12th Regt., 2nd Bat.	959	907	10	1	11	11	945·8	11·47	11·47	Plymouth	8
										Cork	4
15th Regt., 1st Bat.	868	575	6	1	7	59	662·4	8·06	67·97	Cork	5
										Curragh	4
										Dublin	3

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Regiments, &c.	Strength.	Admitted into Hospital.	Died. In Hospital.	Died. Out of Hospital.	Total Deaths.	Discharged as Invalids.	Ratio per 1,000. Admitted.	Ratio per 1,000. Died.	Ratio per 1,000. Invalided.	Stations.	months.
16th Regt., 1st Bat.	838	677	5	1	6	7	807·9	7·16	8·35	Shorncliffe	8
										Sheffield	3½
16th Regt., 2nd Bat.	896	957	11	..	11	22	1068·1	12·28	24·55	Curragh	4
										Aldershot	7⅔
17th Regt., 2nd Bat.	839	331	3	..	3	9	394·5	3·57	10·73	Shorncliffe	4
										Dublin	1
										Curragh	7
18th Regt., 2nd Bat.	857	538	5	1	6	19	627·8	7·00	22·17	Shorncliffe	8
										Portsmouth	4
19th Regt., 2nd Bat.	918	649	5	1	6	11	706·9	6·53	11·98	Portsmouth	4
										Dublin	4½
										Curragh	3½
20th Regt., 2nd Bat.	969	734	6	..	6	8	757·5	6·19	8·26	Curragh	4
										Aldershot	8
21st Regt., 2nd Bat.	851	543	3	1	4	7	638·1	4·77	8·22	Shorncliffe	12
25th Regt., 2nd Bat.	969	971	4	..	4	43	1002·1	4·13	44·37	Aldershot	8
										Shorncliffe	4
26th Regt. ..	876	513	8	1	9	53	585·6	10·27	60·50	Dublin	4
										Edinburgh	8
29th Regt. ..	847	780	4	1	5	32	920·9	5·90	37·78	Aldershot	12
32nd Regt. ..	833	695	3	1	4	25	834·3	4·80	30·01	Aldershot	7½
										Plymouth	4½
36th Regt. ..	848	825	4	..	4	77	972·9	4·72	90·80	Dublin	3
										Curragh	6
										Kilkenny	3
41st Regt. ..	860	617	11	1	12	28	717·4	13·95	32·56	Aldershot	7
										Parkhurst	5
45th Regt. ..	854	993	3	..	3	30	1162·8	3·51	35·12	Aldershot	12
49th Regt. ..	866	705	5	..	5	15	814·1	5·77	17·32	Aldershot	4
										Portsmouth	8
53rd Regt. ..	812	955	6	3	9	40	1176·1	11·08	49·26	Devonport	6
										Aldershot	6
55th Regt. ..	843	721	5	3	8	22	855·3	9·49	26·09	Aldershot	4
										Jersey	8
58th Regt. ..	815	689	6	7	13	39	815·4	15·95	47·85	Sheffield	8
										Newcastle, &c.	4
60th Regt., 1st Bat.	850	839	4	1	5	14	987·1	5·88	16·47	Dover	7
										Aldershot	5
61st Regt. ..	783	1,189	2	4	6	36	1518·5	7·66	45·98	Plymouth	7½
										Aldershot	4½
76th Regt. ..	844	939	2	2	4	10	1112·6	4·74	11·84	Waterford	2
										Glasgow	10
78th Regt. ..	863	757	8	4	12	16	877·2	13·90	18·51	Edinburgh	4
										Aldershot	8
84th Regt. ..	860	905	5	1	6	21	1052·3	6·97	24·42	Manchester	3½
										Aldershot	8½
86th Regt. ..	875	548	6	4	10	30	626·3	11·43	34·28	Newry	4½
										Curragh	4½
										Dublin	3
96th Regt. ..	844	578	3	..	3	31	684·8	3·55	36·72	Dublin	3
										Curragh	6
										Newry, &c.	3
Rifle Brig., 1st Bat.	820	628	2	1	3	84	765·8	3·66	102·44	Aldershot	3½
										Dublin	4½
										Curragh	3½
	26,719	22,677	161	44	205	935	848·7	7·67	34·99		

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Depôt Battalions.	Strength.	Admitted into Hospital.	Died.		Total Deaths.	Discharged as Invalids.	Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.			Admitted.	Died.	Invalided.	
Cavalry Depôts:										
Canterbury ..	680	1,065	3	2	5	100	1566·2	7·35	147·06	Canterbury
Maidstone ..	421	416	1	2	3	20	988·1	7·12	47·5	Maidstone
	1,101	1,481	4	4	8	120	1345·1	7·27	108 99	
Royal Artillery Depôt Brigade	3,314	4,498	31	3	34	281	1357·3	10·26	84·79	Woolwich Warley Sheerness
1st Depôt Battn.	952	1,285	3	6	9	140	1349·8	9·45	147·10	Chatham
2nd „ ..	1,182	1,257	10	8	18	133	1063·5	15·23	112·52	Chatham
3rd „ ..	1,074	884	7	5	12	104	823·1	11·17	96·83	Chatham
4th „ ..	856	898	7	3	10	30	1049·1	11·68	35·04	Canterbury
5th „ ..	930	816	7	6	13	116	877·4	13·98	124·73	Parkhurst
6th „ ..	886	859	5	5	9	38	969·5	11·28	42·89	Walmer
7th „ ..	1,187	1,322	12	4	16	80	1113·8	13·48	67·39	Winchester
8th „ ..	949	946	14	5	19	96	996·8	20·02	101·16	Pembroke
9th „ ..	1,018	839	10	7	17	54	824·2	16·69	53·04	Colchester
10th „ ..	993	1,242	10	4	14	67	1250·8	14·10	67·47	Colchester
11th „ ..	995	852	7	6	13	73	856·3	13·06	73·37	Preston
12th „ ..	666	732	5	2	7	17	1099·1	10·51	25·52	Athlone
13th „ ..	1,201	888	9	1	10	34	739·4	8·33	28·31	Birr
14th „ ..	1,035	973	1	2	3	74	940·1	2·90	71·49	Belfast
15th „ ..	976	685	7	3	10	78	701·8	10·24	79·92	Buttevant
16th „ ..	818	784	6	4	10	40	958·4	12·22	48·90	Templemore
17th „ ..	955	1,076	8	5	13	139	1126·7	13·61	145·55	Limerick
18th „ ..	1,295	1,149	8	5	13	115	887·3	10·04	88·80	Fermoy
19th „ ..	744	645	3	3	6	66	866·9	8·06	88·71	Fermoy
20th „ ..	1,185	672	5	4	9	97	567·1	7·59	81·86	Cork
21st „ ..	639	570	2	1	3	27	892·0	4·69	42·25	Chichester
22nd „ ..	798	653	5	4	9	63	818·3	11·28	78·95	Stirling
23rd „ ..	636	625	2	4	6	72	982·7	9·43	113·20	Aberdeen
	21,970	20,652	153	97	249	1,753	940·0	11·33	79·79	

In the Household Cavalry the admissions are still most numerous in the Royal Horse Guards, but the difference is less marked than formerly, the proportion in that corps having diminished, while in the two regiments of Life Guards it has increased.

In the Cavalry of the Line the admissions have been greatly in excess in the 18th Hussars, at Aldershot and Brighton; the 12th Lancers, at York and Aldershot; the 15th Hussars, at Cahir, the Curragh, and Dublin; the 4th Dragoon Guards, at Birmingham and Dublin; and the 9th Lancers, at Aldershot. With the exception of the 12th Lancers, these are the Cavalry Regiments which had the highest proportion of admissions into hopital in 1860. The 12th Lancers returned home from India in the end of June 1860, and it is probable that the high ratio of admissions into hospital in 1861 may have been to some extent due to their previous service in a tropical climate.

The regiments in which the admissions were much below the average were the 5th Dragoon Guards, at Brighton, Aldershot, Norwich, and Ipswich; the 1st Dragoons, at Dublin, Newbridge, and Birmingham; the 5th Lancers, at Aldershot and Hounslow; the 11th Hussars, at Manchester, the Curragh, and Dublin; and the 16th Lancers, at Hounslow and Aldershot. It is worthy of remark that these were the five Cavalry Regiments in which the lowest ratio of admissions occurred in 1860, so that during the year now under review they have maintained the same healthy standard.

In the Military Train the admissions were most numerous in the 1st Battalion at Aldershot and Woolwich, and least in the 5th Battalion at the Curragh, Woolwich, and Shorncliffe. The 1st Battalion (at that time the 7th) furnished the highest ratio in 1860. *United Kingdom.*

The Scots Fusilier Guards continue to furnish the lowest proportion of admissions in the Foot Guards, but the difference is less marked than formerly.

The Infantry Regiments having the highest ratio of admissions were the 61st, at Plymouth and Aldershot; the 53rd, at Devonport and Aldershot; the 45th, at Aldershot; the 76th, at Waterford and Glasgow; the 84th, at Manchester and Aldershot; the 2nd Battalion, 16th Regiment, at the Curragh and Aldershot; and the 2nd Battalion, 25th Regiment, at Aldershot and Shorncliffe. The corps which furnished the smallest proportion of cases were the 2nd Battalion, 17th Regiment, at Shorncliffe, Dublin, and the Curragh; the 1st Battalion, 10th Regiment, Aldershot and Shorncliffe; the 26th, at Dublin and Edinburgh; the 86th, at Newry, the Curragh, and Dublin; the 2nd Battalion, 18th Regiment, at Shorncliffe and Portsmouth; the 2nd Battalion, 21st Regiment, at Shorncliffe; and the 1st Battalion, 15th Regiment, at Cork, the Curragh, and Dublin.

When it is found that the most sickly and most healthy corps have been stationed at the same places during a considerable part of the year, as in the instances of the 18th Hussars and 5th Dragoon Guards, the 15th and 11th Hussars, the 9th and 5th Lancers, the 2nd Battalion, 25th Regiment, and 1st Battalion, 10th Regiment, an important field of inquiry is suggested to the Medical Officers of sickly corps into the causes to which this great difference in the condition of the regiments is to be attributed.

Re-Vaccination.

During the year 2,053 soldiers and 4,395 recruits were vaccinated with the following results. The numbers from which the ratios have been calculated will be found in Abstract, No. II. of the Appendix.

Class.	Number.	Results.	In those who bore marks of previous Small-Pox.	In those who bore good marks of previous Vaccination.	In those who bore doubtful marks of previous Vaccination.	In those who bore no marks of previous Vaccination or Small-pox.	Total.
Soldiers, not Recruits	2,053	A perfect Vaccine pustule	451·4	484·6	236·8	326·	430·6
		A modified ditto	159·6	157·4	505·3	277·5	218·7
		A failure in	389·	358·	257·9	396·5	350·7
		Total..	1000·	1000	1000·	1000·	1000·
Recruits ..	4,395	A perfect Vaccine pustule	345·5	407·3	461·3	527·3	415·5
		A modified ditto	266·8	240·8	301·3	202·6	242·5
		A failure in	387·7	351·9	237·4	270·1	342·
		Total..	1000·	1000·	1000·	1000	1000·

These results show a smaller proportion of perfect vaccine pustules, and a larger ratio of failures, especially among the recruits, than the returns of the preceding year.

During the course of the year in an average force of 88,955 men, there were 51 cases of small-pox reported, of which four died. They are all stated to have occurred in men bearing marks of vaccination.

The proportion of recruits bearing marks of vaccination is shown by the returns of the different recruiting districts to have been as follows :—

United Kingdom.

Recruiting Districts.	Marks of Small Pox.	Marks of Vaccination.	No satisfactory Marks.	Proportion in every 1,000. Marks of Small Pox.	Marks of Vaccination.	No satisfactory Marks.
London	105	1,853	147	50	880	70
Liverpool	168	883	143	141	739	120
Bristol	111	938	131	94	795	111
York	61	516	56	96	815	89
Edinburgh	23	276	42	68	809	123
Glasgow	77	670	62	95	828	77
Belfast	46	382	7	106	878	16
Dublin	62	519	55	98	816	86
Cork	24	221	13	93	857	50
England	445	4,190	477	87	820	93
Scotland	100	946	104	87	823	90
Ireland	132	1,122	75	99	844	57
Total ..	677	6,258	656	89	825	86

This Table shows a considerably lower proportion than in the preceding year of men bearing marks of small-pox, and also a slight reduction in the proportion bearing no satisfactory marks.

Section II.

On the Extent of Invaliding.

The following Table shows the number of men discharged by invaliding in 1861 from the Army serving at home, and also the number from the Corps included in the preceding remarks on the health of the different arms :—

	Troops generally.	Household Cavalry.	Dragoon Guards and Dragoons.	Royal Artillery (including the Depôt Brigade.)	Military Train.	Foot Guards.	Infantry Regiments.	Depôt Battalions.
Strength	88,955	1,219	9,528	13,335	1,817	5,811	26,719	21,970
1861.. Number discharged as Invalids ..	4,554	10	448	281	70	164	935	1,742
1861.. Ratio per 1,000	51·19	8·2	47·	21·1	38·5	28·2	35·	72·3
1859–60, Ratio per 1,000	..	11·1	18·9	20·2*	21·7*	22·2	17·2	21·6*

We have already, p. 13, noticed the cause of the higher ratio of invaliding in 1861 from the Cavalry and Infantry of the Line, and have shown the classes of diseases for which the invaliding has taken place. It does not appear necessary, therefore, to make any further remarks on the subject.

* The ratio for 1860 only.

Section III.

United Kingdom.

On the Number constantly Sick in Hospital of the Troops serving in the United Kingdom.

The following Table shows the proportion of the men constantly non-effective from sickness; that for the troops generally has been obtained from the weekly sick Returns, and the information respecting the different arms has been compiled from the Annual Returns:—

		Troops generally.	Household Cavalry.	Cavalry of the Line.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Depôt Battalions.
Mean Daily Sick per 1,000 of strength	1861	54·50	31·38	43·43	57·13	50·22	51·73	46·12	51·48
	1860	54·72	28·68	41·67	57·51	62·66	52·00	48·13	57·55
		Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.
Average Sick Time to each Man in the course of the Year	1861	19·89	11·45	15·85	20·85	18·33	18·88	16·83	18·79
	1860	19·97	10·47	15·24	20·99	22·87	18·98	17·57	21·01
Average duration of the Cases	1861	19·40	20·41	16·35	20·63	19·85	23·79	19·84	19·99
	1860	18·97	20·39	16·51	20·16	19·84	25·07	19·43	19·09

These results correspond very closely in the two years, except for the Military Train and Depôt Battalions, which both show a considerable reduction in the mean daily sick and average sick-time to each man serving. The average duration of cases in the Foot Guards which, in 1860, showed an increase of a day and-a-quarter, has fallen in 1861 to its former amount.

Section IV.

On the Influence of Age on the Mortality of Troops serving in the United Kingdom.

The following summary, compiled from Abstract No. III. of Appendix, shows the ratio of mortality by ages in quinquennial periods in the different arms of the Service, and in civil life in England and Wales:—

Corps.	Annual Ratio of Deaths per 1,000 Living at the following Ages:—					
	Under 20.	20–24.	25–29.	30–34.	35–39.	40 and upwards.
Household Cavalry	..	3·12	13·29	5·43	6·17	34·01
Dragoon Guards and Dragoons	2·96	5·82	3·82	12·66	12·74	28·67
Royal Artillery	1·52	5·03	11·53	13·51	20·33	..
Military Train	3·39	7·94	5·22	12·99	..	95·24
Foot Guards	..	8·40	10.35	11·42	21·51	..
Infantry Regiments	2·61	6·79	10·51	11·83	10·22	17·02
Cavalry Depôts, Depôt Brigade Royal Artillery, and Depôt Battalions	5·57	9·93	11·18	16·04	18·63	26. 81
Average of preceding, exclusive of all Depôts	2·34	6·40	9·65	11·97	12·07	23·61
Civil Male Population. England and Wales	7·41	8·42	9·21	10·23	11·63	13·55
Civil Male Population. Healthy Districts	5·83	7·30	7·93	8·36	9·	9·86

United Kingdom.

This Table shows the mortality among the troops, exclusive of the Depôts, to have been lower than that of the male population in the healthy districts of England and Wales, under the age of 25, to have been nearly identical with that of the male population generally between 25 and 30 years of age, and to have been higher than that of the civil population above the latter age. At each of the periods the mortality of the Depôts has been in excess of the rest of the troops, and also, except for those under 20, of the civil population—a result probably attributable in a great degree to the health of many of the men having been impaired by service in unhealthy climates.

Section V.

On the Recruiting for the Army.

The number of recruits examined at the head-quarters of the recruiting districts amounted to 12,191, of whom 4,600 were found unfit for service. The number of primary inspections was 7,993, and of secondary 4,198 ; and the rejections in each were 3,605 and 995.

The following Table shows the number examined, and the proportion rejected, in each of the districts. The details will be found in Abstract No. IV. of Appendix.

Districts.	Total Number of Recruits Inspected.	Ratio found unfit for Service of every 1,000 Recruits.			
		Primary Inspections.	Secondary Inspections, previously examined by		Total.
			Army Surg.	Civilians.	
London	3,694	478	164	253	430
Liverpool	1,830	392	192	330	348
Bristol	1,605	400	84	235	265
York	841	333	151	239	247
Edinburgh	545	416	222	243	374
Glasgow	1,465	464	..	190	448
Belfast	676	440	80	266	357
Dublin	1,069	454	212	251	405
Cork	466	546	180	333	446
Total ..	12,191	451	155	259	377
Ratio in 1861		318	90	178	256

It will be seen from this Table that the rejections were in a much higher proportion to the number examined than during the preceding year. This result affords a strong confirmation of the remark made in the Report for 1860, that "in the British Army, kept up as it is by voluntary enlistment, the proportion of rejections must vary considerably with reference to the demand and supply." In 1861 a much smaller number of men was required, and greater strictness in the selection was observed. The total number inspected at the head quarters of districts was only 12,191, while in 1860 it amounted to 27,853, and the rejections were in the proportion of three to two. This increase in the ratio of rejections was not confined to any class of recruits, or to any district, but affected both primary and secondary inspections. In some of the districts the increase was greater than in others ; thus in Cork and Dublin the proportion rejected of primary inspections was doubled, while in Edinburgh, Glasgow, and Belfast it was not greatly in excess of the preceding year ; but it must not be forgotten that the ratio in the latter was then considerably above the average.

The native countries of the recruits inspected are shown in the following Table, prepared from Abstract No. V. of Appendix :— *United Kingdom.*

Native Countries of Recruits.	Inspected.	Rejected.	Ratio per 1,000 Rejected.	
			1861.	1860.
England	6,237	2,257	362	243
Wales	235	60	255	233
Scotland	1,899	778	410	318
Ireland	3,742	1,476	394	258
British Colonies and Foreign Countries..	78	29	372	299
Total ..	12,191	4,600	377	256

These figures show that in 1861, as in the previous year, the proportion of rejections was highest among the natives of Scotland, and lowest among those of Wales and of England.

The relative number furnished by each country has been :—

	Of every 1,000 Recruits.			
	England and Wales.	Scotland.	Ireland.	The Colonies and Foreign Countries.
1861 ..	531	156	307	6
1860 ..	566	107	321	6

Showing an increase in the proportion of enlistments of the natives of Scotland.

The number enlisted for each arm of the Service, and the proportion rejected, were as follows :—

Corps.	Primary Inspections.			Secondary Inspections.		
	Inspected.	Rejected.	Ratio per 1,000 Rejected.	Inspected.	Rejected.	Ratio per 1,000 Rejected.
Cavalry	663	297	448	55	9	164
Artillery	3,701	1,783	482	2,273	582	256
Engineers ..	500	183	366	147	24	163
Military Train ..	2	..	..	..	..	..
Foot Guards ..	139	44	317	1	1	..
Infantry of Line..	2,988	1,298	434	1,722	379	220
Total ..	7,993	3,605	451	4,198	995	237

The causes of rejection of the recruits found unfit for service are classified in the following Table :—

RETURN showing the Number of Recruits rejected during the Year 1861, with the Causes arranged in Classes, and the Ratio per 1000 in each Class.

Class.	Causes of Rejection, in Classes.	Primary Inspections.						Total.		Secondary Inspections.						Total.	
		4,721		1,794		1,478		7,993		3,249		216		733		4,198	
		England.		Scotland.		Ireland.		United Kingdom.		England.		Scotland.		Ireland.		United Kingdom.	
		Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.
1	Syphilis	64	13·56	10	5·57	17	11·50	91	11·38	43	13·23	1	4·62	1	1·36	45	10·72
2	Other Zymotic Diseases	6	1·27	1	·56	2	1·35	9	1·13	..	..	..	..	..	..	..	..
3	Scrofula	86	18·22	19	10·59	32	21·65	137	17·14	31	9·54	..	..	4	5·46	35	8·34
4	Phthisis	28	5·93	11	6·13	1	·68	40	5·	6	1·85	..	..	2	2·73	8	1·91
5	Other Constitutional Diseases	11	2·33	1	·56	5	3·38	17	2·13	8	2·46	..	..	..	..	8	1·91
6	Diseases of Brain, Spinal Cord, and Nerves	5	1·06	..	..	..	..	5	·62	..	..	..	..	..	..	..	..
7	Diseases of Eyes and Eyelids	97	20·55	58	32·33	73	49·39	228	28·52	46	14·16	4	18·52	15	20·46	65	15·48
8	Diseases of Nose and Mouth	11	2·33	2	1·11	..	..	13	1·63	8	2·46	..	..	..	..	8	1·91
9	Diseases of Ears	21	4·45	1	·56	5	3·38	27	3·38	5	1·54	..	..	1	1·36	6	1·43
10	Deafness	8	1·69	..	..	1	·68	9	1·13	1	·31	..	..	..	..	1	·24
11	Impediment of Speech	7	1·48	1	·56	5	3·38	13	1·63	2	·62	..	..	1	1·36	3	·71
12	Disease of Heart	139	29·44	13	7·25	52	35·10	204	25·52	40	12·31	..	..	11	15·01	51	12·15
13	Disease of Arteries (Aneurism)	2	·42	..	..	..	..	2	·25	2	·62	..	..	..	..	2	·48
14	Disease of Veins (Varix)	131	27·75	97	54·07	98	66·31	326	40·79	52	16·01	10	46·30	17	23·19	79	18·82
15	Disease of Lungs (except Phthisis)	..	..	1	·56	8	5·41	9	1·13	..	..	..	..	5	6·82	5	1·19
16	Small or Malformed Chest, and Curvature of Spine	274	58·04	140	78·04	31	20·97	445	55·67	66	20·31	5	23·15	14	19·10	85	20·25
17	Loss or Decay of many Teeth	40	8·47	16	8·92	6	4·06	62	7·76	52	16·01	1	4·62	..	..	53	12·62
18	Hernia	98	20·76	14	7·80	7	4·74	119	14·89	35	10·77	..	..	..	..	35	8·34
19	Laxity of Abdominal Rings, showing tendency to Hernia	45	9·53	16	8·92	33	22·33	94	11·76	23	7·08	1	4·62	11	15·01	35	8·34
20	Hæmorrhoids	39	8·26	6	3·34	2	1·35	47	5·88	16	4·92	2	9·25	1	1·36	19	4·52

RETURN, &c.—*continued.*

Class.	Causes of Rejection, in Classes.	Primary Inspections.						Totals.		Secondary Inspection.						Totals.	
		England.		Scotland.		Ireland.		United Kingdom.		England.		Scotland.		Ireland.		United Kingdom.	
		Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.
21	Diseases of the Urinary Organs	1	·21	2	1·11	..	..	3	·37	3	·92	..	..	..	..	3	·71
22	Varicocele	139	29·44	22	12·26	27	18·27	188	23·52	49	15·08	2	9·25	11	15·01	62	14·77
23	Hydrocele	14	2·97	2	1·11	2	1·35	18	2·25	14	4·31	..	..	..	..	14	3·33
24	Other Diseases of the Genital Organs (not Venereal)	25	5·30	5	2·79	1	·68	31	3·89	8	2·46	1	4·62	5	6·82	14	3·33
25	Muscular Tenuity	122	25·84	86	47·94	84	56·83	292	36·53	31	9·54	6	27·78	15	20·46	52	12·39
26	Debility	14	2·97	8	4·46	20	13·53	42	5·25	13	4·	..	..	13	17·74	26	6·19
27	Defects of Upper Extremities, from Fracture, Contraction, Luxation, &c.	39	8·26	43	23·97	7	4·74	89	11·13	33	10·16	1	4·62	6	8·19	40	9·53
28	Defects of Lower Extremities, from Fracture, Contraction, Luxation, &c.	172	36·43	98	54·63	57	38·57	327	40·91	74	22·77	2	9·25	19	25·92	95	22·63
29	Diseases of Joints	12	2·54	1	·56	1	·68	14	1·75	4	1·23	..	..	..	..	4	·95
30	Other Affections of Bones and Muscles	2	·42	3	1·67	5	3·38	10	1·25	2	·62	1	4·62	..	..	3	·71
31	Ulcers, Wounds, and Cicatrices	37	7·84	23	12·82	16	10·82	76	9·51	11	3·39	3	13·88	4	5·46	18	4·29
32	Other Affections of the Cutaneous System ..	30	6·35	25	13·94	14	9·47	69	8·63	16	4·92	4	18·52	2	2·73	22	5·24
33	Weakness of Intellect	..	..	1	·56	3	2·03	4	·50	1	·31	..	..	1	1·36	2	·48
34	Malformation of Ears	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
35	„ Nose and Mouth	..	..	..	..	..	..	..	..	2	·62	..	..	..	..	2	·48
36	„ Chest and Spine	127	26·90	7	3·90	9	6·09	143	17·89	18	5·54	..	..	..	..	18	4·29
37	„ Urinary and Genital Organs ..	6	1·27	..	..	..	..	6	·75	5	1·54	..	..	..	..	5	1·19
38	Marks of Punishment or of letter D	30	6·35	5	2·79	5	3·38	40	5·	4	1·23	..	..	..	..	4	·95
39	Unsound Health, Marks of Cupping, Blistering, &c.	218	46·18	75	41·80	63	42·62	356	44·54	34	10·46	3	13·88	31	42·29	68	16·20
	Total	2100	444·81	813	453·18	692	468·11	3605	451·01	758	233·30	47	217·50	190	259·20	995	237·02

United Kingdom.

United Kingdom.

On comparing this with the corresponding Table in the Report for 1860, a considerable difference will be found in the relative amount of several of the causes of rejection. Thus, small or mal-formed chest, which has given rise to a much larger number than any other cause, stood then sixth in order as regards frequency; while diseases of the eyes and eyelids, which then stood second, have undergone a great reduction. On grouping the classes together we find that upwards of two-fifths of the rejections were for causes indicative of ill-health or feeble constitution, and one-fifth for defects which would have affected the power of marching of the men.

Some of the differences which were pointed out in last Report in the relative amount of particular causes of rejection in England, Scotland, and Ireland have disappeared in the present Return, but there is still a considerable excess in the amount of diseases of the eyes and eyelids in Ireland. It is, however, hardly safe to draw any deductions on these points until we have returns extending over a number of years.

The ages of the recruits enlisted in each division of the United Kingdom will be found in Abstract No. VI. of Appendix, from which the following Table has been prepared, showing the proportion at each age in every 10,000 examined:—

Boys under 17.	17 to 18.	18 to 19.	19 to 20.	20 to 21.	21 to 22.	22 to 23.	23 to 24.	24 to 25.	25 and upwards.
205	649	2,592	1,449	1,120	839	705	516	591	1,334

On comparing this with the results for 1860, it will be found that there has been an increase in the proportion enlisted under twenty, and a decrease in that of men above that age.

During the year several changes were made in the standard height at which recruits were allowed to be enlisted. Until the 7th of March the minimum height was 5 feet 4 inches; it was then raised to 5 feet 8 inches; and on the 16th of April was reduced to 5 feet 6 inches, at which it remained till the end of the year. These restrictions during a portion of the year, render it impossible to make an accurate comparison with the results of 1860, of the proportion of men at different heights. Detailed information as to the number at each height will be found in Abstract No. VI. of Appendix, from which the following summary has been framed, showing the proportion at each height in 10,000 men:—

Ft.	In.		Ft.	In.		
Under 5	3				..	201
5	3	to	5	4	..	52
5	4	„	5	5	..	1,823
5	5	„	5	6	..	1,552
5	6	„	5	7	..	1,917
5	7	„	5	8	..	1,890
5	8	„	5	9	..	1,208
5	9	„	5	10	..	685
5	10	„	5	11	..	425
5	11	„	6	0	..	156
6	0	and upwards			..	91
				Total	..	10,000

The same objection applies to the information respecting the average weight of the recruits during the past year, as the necessary result of raising the standard height would be to decrease the proportion enlisted of the lighter weights. The following Table, compiled from Abstract No. VII. of Appendix, shows the proportion of men at the different weights enlisted during 1861:

Under	100 lbs.	.. .. ..	209
From	100 to 110 lbs.	.. .. ..	365
„	110 „ 120	.. .. ..	1,651
„	120 „ 130	.. .. ..	2,581
„	130 „ 140	.. .. ..	2,539
„	140 „ 150	.. .. ..	1,679
„	150 „ 160	.. .. ..	652
„	160 „ 170	.. .. ..	240
„	170 upwards	.. .. ..	84
		Total	10,000

The extent of education among the recruits is shown in the following Table condensed from Abstract No. VIII. of Appendix, in which the numbers are given for each of the recruiting districts :—

Of every 1,000 Recruits examined.	Unable to read or write.	Able to read only.	Able to read and write.
In English Districts	271	55	674
In Scotch „	168	157	675
In Irish „	328	96	576
Total	264	79	657

These results correspond pretty nearly with those given in the Report for 1860. The chief difference is an increase in the number wholly uneducated in the English districts, and in the proportion able to write among the Irish recruits.

From a document prepared for the Statistical Congress by order of the Secretary of State for War, it appears that, on the 1st of January 1860, the state of education among the men serving in the Army was as follows :—

	Unable to read or write.	Able to read only.	Able to read and write.	Of superior Education.
Number serving	36,263	37,863	94,396	10,062
In every 10,000 serving ..	2,031	2,120	5,286	563

On comparing these with the results in the preceding Table, it will be observed that the proportion unable to read and write is considerably less in the ranks of the Army than among the recruits ; but as it still amounts to one-fifth of the strength, and men able "to read only" constitute another fifth, there is evidently ample scope for the labours of the regimental schoolmaster. In the Recruiting Returns we have included under the head of "able to read and write" those stated to be of superior education, as it must be manifest that the medical officer in charge of a district has no means of ascertaining the extent of a recruit's acquirements in this respect during the short period necessarily allotted for the inspection.

The occupations of the recruits inspected, and the number rejected of each class, are shown in the following Table :—

Occupations of Recruits.		England.		Scotland.		Ireland.		Total.	
		Number Examined.	Ratio per 1,000 of each Class Rejected.	Number Examined.	Ratio per 1,000 of each Class Rejected.	Number Examined.	Ratio per 1,000 of each Class Rejected.	Total Number Examined.	Total Ratio per 1,000 of each Class Rejected.
1. Labourers, Husbandmen, and Servants	Number inspected	3,973	..	672	..	1,263	..	5,908	..
	„ rejected	1,450	365	302	449	509	403	2,261	383
2. Manufacturing Artisans (as Clothworkers, Weavers, Lace Makers, &c.)	„ inspected	1,171	..	417	..	250	..	1,838	..
	„ rejected	592	506	169	405	91	364	852	464
3. Mechanics employed in Occupations favourable to physical development (as Carpenters, Smiths, Masons, &c.)	„ inspected	1,735	..	768	..	455	..	2,958	..
	„ rejected	622	359	323	421	195	429	1,140	385
4. Shopmen and Clerks.. ..	„ inspected	893	..	128	..	150	..	1,176	..
	„ rejected	291	324	62	484	72	480	425	361
5. Professional Occupations, Students	„ inspected	43	..	15	..	10	..	68	..
	„ rejected	18	419	4	267	4	400	26	382
6. Boys	„ inspected	150	..	10	..	83	..	243	..
	„ rejected	23	153	..	..	10	120	33	136
Total Inspected		7,970	..	2,010	..	2,211	..	12,191	..
Total Rejected		2,996	376	860	428	881	398	4,737	389

This shows the highest proportion of rejections to have been among the manufacturing artisans, and the lowest (with the exception of the boys, who form a special class) among the shopmen and clerks. In 1861, the highest and lowest proportions were in Classes 3 and 5 respectively.

Of every 1,000 recruits examined the proportion belonging to each group of occupations was as follows :— *United Kingdom.*

Occupations of Recruits.	Of every 1,000 Recruits examined in—			
	England.	Scotland.	Ireland.	United Kingdom
1. Labourers, Husbandmen, and Servants ..	493	334	571	484
2. Manufacturing Artisans (as Clothworkers, Weavers, Lace Makers, &c.)	147	208	113	151
3. Mechanics employed in Occupations favourable to Physical Development (as Carpenters, Smiths, Masons, &c.)	218	382	206	243
4. Shopmen and Clerks	113	64	68	96
5. Professional Occupations, Students ..	5	7	4	6
6. Boys	19	5	38	20

These differ but little from the results of 1860, except that the proportion of boys is doubled, the number being almost the same as in the preceding year, while that of the other classes has only amounted to one half. As the boys are mostly sons of soldiers, or enlisted from the Royal Military Asylum, Chelsea, and the Royal Hibernian School, Dublin, the numbers do not fluctuate as in the other classes of occupations.

It appears from the Return already referred to, that the previous occupations of the men serving in the Army on the 1st of January, 1860, were as follows :—

Occupations.	Number.	Occupations.	Number.
Baker	2,655	Locksmith	272
Blacksmith	2,527	Matmaker	43
Bleacher	222	Maltster	78
Bookbinder	323	Mason	2,144
Brewer	187	Miller	496
Bricklayer	1,976	Miner	2,874
Brickmaker	812	Nailmaker	488
Butcher	1,762	Painter	2,146
Cabinetmaker	937	Papermaker	187
Carpenter and Joiner	4,001	Plasterer	892
Clerk, Attorney's	600	Plumber and Glazier	656
„ Commercial	4,078	Potter	608
Clothworker	591	Printer	1,197
Coachmaker	297	Ropemaker	427
Cooper	693	Saddler or Harnessmaker ..	831
Cotton and Calicoprinter ..	432	Sawyer	1,113
Currier	302	Servant	5,285
Draper	607	Shipwright	146
Druggist	244	Shoemaker	7,404
Dyer	756	Silk Manufacturer	273
Engine and Machinemaker ..	1,100	Smith, generally	2,886
Farmer or Grazier	687	Stocking maker	422
Farrier	556	Tailor	5,032
Founder	670	Tanner	202
Gardener	1,162	Tinman	396
Glassblower	182	Turner	498
Glover	148	Watchmaker	427
Grocer	710	Warehouseman	279
Groom or Ostler	5,630	Weaver	8,105
Hairdresser	309	Wheelwright	631
Hatter	266	Woollen cloth Manufacturer ..	355
Hurdlemaker or Thatcher ..	119	Worsted Manufacturer ..	186
Ironmoulder	888	Miscellaneous trades and callings not otherwise specified ..	20,405
Lacemaker	349		
Labourer, Agricultural ..	31,115		
„ Branches undefined	69,861	Total ..	205,382
Linen Flax Manufacturer ..	244		

Gibraltar.

II.—ON THE HEALTH OF THE TROOPS SERVING IN THE MEDITERRANEAN.

Section I.—Sickness and Mortality.

I.—Gibraltar.

The garrison consisted of the same troops as in 1860, except that early in the year the 5th was replaced by the 1st Brigade Royal Artillery from England, and two companies of Royal Engineers were during the course of it also relieved from home.

The average strength of the garrison was 5,520 non-commissioned officers and men, among whom there were 5,119 admissions into hospital, 35 deaths in hospital, 8 out of hospital, and 7 among invalids after their return to England, making a total of 50 deaths. These numbers show the cases to have amounted to 927, and the deaths to 9·06, per 1,000 of the strength; the former being an increase of 98, and the latter a decrease of 2· per 1,000 on the results of the previous year.

The following summary shows the relative sickness and mortality in each corps:—

Corps.	Average Strength.	Admissions into Hospital.	Died.				Ratio per 1,000 of Strength.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery..	1,048	957	8	4	2	14	913	13·36
Royal Engineers	303	322	5	2	..	7	1,063	23·10
2nd Battalion 6th Regiment ..	826	718	3	..	..	3	869	3·63
„ „ 7th „ ..	840	798	10	1	1	12	950	14·28
„ „ 8th „ ..	854	859	6	..	1	7	1,006	8·20
1st „ 25th „ ..	789	627	3	..	2	5	795	6·34
100th Regiment	852	773	..	1	1	2	907	2·35

Thus the highest ratio, both of sickness and mortality, has been in the Royal Engineers: with this exception, the 2nd Battalion 8th Regiment has had the largest proportion of admissions, and the 2nd Battalion 7th Regiment, of deaths. The mortality in the Royal Artillery has also been great, but two of the deaths were the result of accidents on duty.

The diseases by which the admissions into hospital and deaths were occasioned are stated in detail in Abstract No. IX. of Appendix. The following summary shows the influence of the principal classes of diseases in 1861, compared with the results of the two preceding years:—

Orders.	Diseases.	1861. Average Strength, 5,520. Admitted into Hospital.	Deaths. At Gibraltar.	Deaths. Of Invalids.	Total Died.	Annual ratio per 1,000 of Strength. Admitted.	Annual ratio per 1,000 of Strength. Died.	1859-60. Annual ratio per 1,000 of Strength. Admitted.	1859-60. Annual ratio per 1,000 of Strength. Died.	1861. Infantry at Home. Annual ratio per 1,000 of Strength. Admitted	1861. Infantry at Home. Annual ratio per 1,000 of Strength. Died.
	Class I.										
1	Miasmatic Diseases ..	1,574	26	...	26	285·1	4·71	284·	5·67	171·9	·86
2	Enthetic „ ..	1,313	..	..	..	237·9	..	213·3	..	305·6	·11
3	Dietic „ ..	70	1	..	1	12·7	·18	15·5	·28	5·4	·04
4	Parasitic „ ..	36	..	..	..	6·5	..	8·1	..	26·3	..
	Class II.										
1	Diathetic „ ..	10	..	..	..	1·8	..	3·9	..	2·2	·19
2	Tubercular „ ..	49	1	5	6	8·9	1·09	5·4	1·11	14·7	2·69
	Class III. Diseases of the—										
1	Nervous system ..	121	2	..	2	21·9	·36	19·9	·09	16·2	·52
2	Circulatory „ ..	19	4	..	4	3·4	·73	6·8	·65	7·7	·67
3	Respiratory „ ..	333	1	..	1	60·3	·18	54·6	·09	87·4	1·16
4	Digestive „ ..	255	2	..	2	46·2	·36	30·8	·19	35·6	·45
5	Urinary „ ..	21	1	1	2	3·8	·36	2·5	·19	2·8	·08
6	Reproductive „ ..	123	..	..	..	22·3	..	9·	..	8·2	..
7	Locomotive „ ..	27	..	1	1	4·9	·18	4·	..	3·3	..
8	Integumentary „ ..	696	..	..	..	126·1	..	141·6	..	97·3	..
	Class IV.										
4	Diseases of Nutrition	11	..	..	..	2·	..	·5	..	1·7	..
	Class V.										
1	Accidents	437	3	..	3	79·2	·55	74·7	·37	60·4	·60
3	Homicide	1	1	.	1	·2	·18	..	·09	·04	·08
4	Suicide	1	1	..	1	·2	·18	..	·56	·2	·11
5	Execution	..	..	..	..	..	..	..	·19	..	·11
6	Corporal Punishment	15	..	..	..	2·7	..	2·9	..	1·5	..
	Diseases not stated ..	..	..	..	..	..	..	6·9	..	·3	..
	No appreciable Disease	7	..	..	..	1·3	..	..	..	..	..
	Total	5,119	43	7	50	927·4	9·06	884·4	9·48	848·7	7·67

From this Table it appears that the increase in the admissions above the average of the two preceding years has been chiefly in venereal and diseases of the digestive and reproductive systems. There has been a reduction to the extent of nearly one per 1,000 in the mortality by miasmatic diseases.

Miasmatic Diseases.—On subdividing this group, as in former reports, the following results are obtained :—

Gibraltar.

Miasmatic Diseases.	Admitted.	Died.	Annual ratio per 1,000. 1861. Admitted.	1861. Died.	1859–60. Admitted.	1859–60. Died.
Eruptive Fevers	2	2	·4	·36	2·7	·28
Paroxysmal „	24	1	4·3	·18	2·9	·19
Continued „	598	20	108·3	3·62	82·4	1·95
Dysentery, Diarrhœa, and Cholera	307	2	55·6	·36	92·9	3·25
Sorethroat and Influenza	84	..	15·2	..	20·2	..
Ophthalmia	206	..	37·3	..	43·9	..
Rheumatism	281	..	50·9	..	28·6	..

Eruptive Fevers.—Only two cases of scarlet fever occurred, but both proved fatal; one in the 2nd Battalion 7th, and the other in the 2nd Battalion 8th Regiment.

Paroxysmal Fevers have been slightly in excess of the average. The cases nearly all occurred in the 1st Brigade Royal Artillery, which arrived from England in the beginning of the year.

Continued Fevers were much more frequent than on the average of the two preceding years, and nearly twice as fatal. The 2nd Battalion 7th Regiment suffered most severely, having had 175 cases and 7 deaths. Next in frequency was the 2nd Battalion 8th Regiment, in which 101 cases occurred, but only 2 proved fatal. The Royal Artillery had 95 cases, with 5 deaths. The surgeon of the 7th Regiment attributed the great prevalence of the disease chiefly to the over-crowding in the Windmill Hill Barracks, to the exposure of the men to the heat of the sun on the public works, and to the imperfect state of the drainage and sewerage. It appears that the average cubic space per man in the barracks, while occupied by this corps, was only 322 feet; that fever became more than usually prevalent in February, and attained its maximum in April (an earlier period than that at which fever is usually most prevalent in Gibraltar), and that it abated in the corps after changing their barracks in the beginning of June. In June, upon the representation of the surgeon, the length of time the men were kept during the day upon the public works was reduced. The surgeon of the 2nd Battalion 8th Regiment attributed the excess of fever in it chiefly to the defective ventilation and over-crowding of the Wellington Front Barrack, in which a portion of the regiment was quartered between February and October, the period during which the greater number of cases occurred.

Dysentery, Diarrhœa, and Cholera have been very much less prevalent and fatal than during the two preceding years. In 1860 Epidemic Cholera, and its usual accompaniment, diarrhœa, raised the proportion of cases much above the average; but during 1861 this group of diseases was less frequent than in 1859, when no such epidemic occurred, and very much under the average of the ten years 1837–46. Notwithstanding this improvement, however, their prevalence is four times as great as among Infantry serving in the United Kingdom.

There has been a decrease during the year in sorethroat and influenza, and in ophthalmia, but an increase in the amount of rheumatism.

Enthetic Diseases.—There has been an increase in the amount of venereal, compared with the average of the two preceding years, and a very marked increase over 1860, so that the improvement noticed in last Report has not been maintained. The Principal Medical Officer states that the police regulations with respect to prostitutes remain unchanged, and he cannot assign any reason for the increase of these diseases.

If the diseases be subdivided into two groups—syphilitic and gonorrhœal—it will be found that the difference in the three years has been chiefly in the former, and that the increase in 1861 has been confined to it. This is shown clearly in the following Table:—

Ratio per 1,000 of Strength admitted into Hospital.	For Syphilitic Diseases.	For Gonorrhœal Diseases.
In 1859	142	117
„ 1860	73	99
„ 1861	138	100

From this it appears that the syphilitic diseases in 1861 have been in nearly double the proportion of 1860, while the gonorrhœal have been almost identical in the two years.

The prevalence of these diseases, and the relative distribution of the two groups, has varied considerably in the different corps, as will be seen by the following Table, showing the ratio of admissions per 1,000 of mean strength in each corps:—

Annual Ratio per 1,000 of Mean Strength.	Syphilitic Diseases.	Gonorrhœal Diseases.	Total Venereal Diseases.
1st Brigade Royal Artillery	173	81	142
5th „ „ „	84	68	255
Royal Engineers	115	59	175
2nd Battalion 6th Regiment	205	138	343
„ „ 7th „	89	94	183
„ „ 8th „	147	88	235
1st „ 25th „	106	94	200
100th Regiment	133	130	263

Thus it appears that the 1st Brigade Royal Artillery, the Royal Engineers, and the 2nd Battalion 7th Regiment, have had the smallest amount of venereal among them, while it has been greatly in excess in the 6th and 100th Regiments, and the 5th Brigade Royal Artillery.

Dietic Diseases.—There has been a marked reduction in these diseases compared with 1860, and it has been entirely in cases of intemperance (*ebriositas*). The ratio of admissions on that account, which was then 29·2, has fallen to 12·5 per 1,000. This reduction has been entirely in the Royal Artillery, and has been due to the removal of the 5th Brigade, which had been a long time in the garrison, and the arrival of the 1st Brigade direct from England. This fact is clearly shown by the circumstance that in 1860 the ratio of admissions for intemperance (*ebriositas*) in the Royal Artillery and Engineers (which were included in the same return) was 96·65 per 1,000 of mean strength; in 1861 the admissions from the 5th Brigade, prior to its leaving Gibraltar, were in the annual ratio of 28·64, from the Royal Engineers 49·50, while from the 1st Brigade Royal Artillery they were 7·64, per 1,000. The admissions from the regiments of the line in 1860 were 8·61, and in 1861 they were 9·80, per 1·000. Whether the continuous residence in a garrison, where the facilities for procuring spirits are unfortunately so great, will lead to a similar result in the 1st as in the 5th Brigade, can only be determined by time. There can be no question, however, that when habits of tippling are acquired, the effects are very much more striking as the men advance in life, and that under such circumstances they are likely to become more developed in each succeeding year of service.

Tubercular Diseases have been the cause of a larger proportion of admissions, but the mortality by them, including deaths among the invalids, has been almost exactly the same as the average of the two preceding years. This reduction in the proportion of deaths to cases, however, may have been to some extent due to the difference in the amount of invaliding, 12 men having been sent home for discharge as invalids, and 21 for change of climate, on account of these diseases in 1861, while in 1860 the numbers were only 4 of each.

Diseases of the Nervous System have again risen to a slightly higher proportion of admissions than the average. The cases of *delirium tremens*, however, have fallen from 47 to 14. Of these, 6 occurred in the 1st Battalion

Gibraltar. 8th Regiment, and 3 in the 1st Battalion 25th Regiment. The reduction in the amount of *delirium tremens* has been counter-balanced by an increase in the amount of insanity (*amentia*) and of cases of head-ache.

Diseases of the Digestive System have been much more prevalent than formerly, the excess being principally in dyspepsia, inflammation of the liver, and jaundice. The first of these prevailed to the greatest extent in the 1st Brigade Royal Artillery, 39 out of 102 cases having occurred in it. The surgeon of the brigade considered these cases to be "the result of the insanitary conditions in the midst of which the soldier lives at Gibraltar, influenced by the high temperature of a Mediterranean summer, and affecting men who were for the first time exposed to their action." The cases of hepatic inflammation and jaundice were in excess only in the 1st Battalion 25th Regiment: of the latter disease 32 out of 62 cases occurred in it. Not only the men, but several of the officers and women also were attacked. The Regiment at the time occupied the South Barracks, but the surgeon states that he was unable to trace any cause to which the disease could be attributed.

The other classes of diseases do not seem to require detailed remarks. Only 1 death by suicide occurred—that of an Artilleryman, who shot himself while under the influence of liquor. Two men of the Royal Artillery were killed by the accidental fall of a traversing platform. A sapper of the Royal Engineers was found dead in a cell at Hargreaves Barracks, having been choked by a piece of food in his windpipe while drunk; another Sapper was found drowned, and a serjeant of the 2nd Battalion 6th Regiment was murdered by a Spaniard.

Corporal punishment was inflicted in 15 instances, being above the number in 1860, but exactly in the ratio of the average of the two years 1859-60.

Malta.

II.—Malta.

No change took place during 1861 in the troops composing the garrison of Malta, except that the 6th Brigade Royal Artillery was relieved in August by the 3rd Brigade from England. The average strength of the troops during the year, exclusive of the Royal Malta Fencible Artillery, was 6,185. The admissions amounted to 4,775, and the deaths to 69, of which 54 occurred in hospital, 5 out of hospital, and 10 among invalids on their passage home and at the invalid depôt at Fort Pitt. These numbers give the proportion of 772 admissions, and 11·15 deaths, per 1,000 of mean strength, being a considerable reduction in the former, and a very trifling increase in the latter, compared with the results of the preceding year.

The admissions and deaths were distributed in the various corps as follows:—

Corps.	Average Annual Strength.	Admitted into Hospital.	Died.				Ratio per 1,000 of Strength.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery	617	588	9	1	..	10	953	16·21
Royal Engineers	245	141	4	..	..	4	575	16·33
2nd Battalion 3rd Foot	873	678	..	..	2	2	777	2·95
„ „ 15th „	857	832	1	1	1	3	971	3·50
1st „ 22nd „	843	874	14	..	3	17	1,037	20·17
2nd „ „ „	865	840	9	..	..	9	971	10·68
„ „ 23rd „	877	505	11	..	3	14	576	16·61
4th „ Rifle Brigade ..	870	432	3	3	1	7	496	8·05

Of the three deaths not accounted for in this Table, two were men of the Hospital Corps, and the third a trained army schoolmaster.

This Table shows the rate of sickness to have ranged between 496 in the *Malta* Rifle Brigade, and 1,037 per 1,000 in the 1st Battalion 22nd Regiment; and of mortality between 2·95 in the 3rd Regiment, and 20·17 per 1,000 in the 1st Battalion 22nd Regiment. It was in the latter corps that the ratio of admissions was highest in 1860, but the ratio of deaths was then greatest in the 2nd Battalion 3rd Regiment, in which it has been lowest during the period now under review.

The following Table shows the admissions and deaths by the different classes of diseases, and the influence of the same classes on the average of the two preceding years. The details for 1861 will be found in Abstract No. IX. of Appendix.

Orders.	Diseases.	1861.—Strength, 6,185.						1859–60.	
		Admitted into Hospital.	Deaths.		Total Died.	Annual ratio per 1,000 of Strength.		Annual ratio per 1,000 of Strength.	
			In Malta.	Of Invalids.		Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic diseases ..	2,162	25	1	26	349·5	4·20	490·9	7·82
2	Enthetic „ ..	632	..	..	..	102·1	..	148·6	..
3	Dietic „ ..	43	..	..	..	7·0	..	7·4	..
4	Parasitic „ ..	79	..	..	..	12·8	..	13·0	..
	Class II.								
1	Diathetic diseases ..	16	..	..	..	2·6	..	2·3	..
2	Tubercular „ ..	59	14	6	20	9·5	3·23	12·2	1·86
	Class III. Diseases of the—								
1	Nervous system ..	95	2	..	2	15·4	·32	18·1	·71
2	Circulatory „ ..	29	3	1	4	4·7	·65	6·5	·62
3	Respiratory „ ..	182	5	..	5	29·4	·81	66·1	1·06
4	Digestive „ ..	222	3	..	3	35·9	·49	57·1	·62
5	Urinary „ ..	9	..	2	2	1·5	32	1·8	·18
6	Reproductive „ ..	84	..	..	..	13·6	..	5·4	..
7	Locomotive „ ..	21	..	..	..	3·4	..	3·4	..
8	Integumentary „ ..	674	..	..	..	109·0	..	175·0	..
	Class IV.								
4	Diseases of Nutrition.	..	..	..	..	..	..	·8	..
	Class V.								
1	Accidents	453	5	..	5	73·2	·81	74·3	1 51
4	Suicide	..	1	..	1	..	·16	..	·18
5	Execution	..	1	..	1	..	·16	..	..
6	Corporal Punishment	15	..	..	..	2·4	..	3·0	..
	Diseases not stated ..	..	..	..	..	..	..	6·0	..
	Total	4,775	59	10	69	772·0	11·15	1091·9	14·56

There has been a marked reduction in the prevalence of miasmatic and enthetic diseases, and in those of the respiratory, digestive, and integumentary systems, compared with the average of the two preceding years. The only class in which there has been an increase is that of diseases of the reproductive organs. The mortality by miasmatic diseases is much below the previous average, but that by tubercular diseases has experienced a considerable increase.

Miasmatic Diseases.—On subdividing this class as usual the following results are obtained:—

Malta.

Diseases.	1861.		Annual Ratio per 1,000 of Mean Strength.			
			1861.		1859–60.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	24	2	3·9	·32	·4	..
Paroxysmal „	11	..	1·8	..	6·7	..
Continued „	876	21	141·6	3·39	237·3	6·23
Dysentery, Diarrhœa, and Cholera	211	2	34·1	·32	107·6	1·41
Sorethroat and Influenza	54	..	8·7	..	15·	..
Ophthalmia	598	..	96·7	..	65·5	..
Rheumatism	358	..	57·9	..	54·3	·17

Eruptive Fevers were much more prevalent than during the two preceding years. The difference was exclusively in small-pox, which was epidemic among the civil population, and of which 20 cases and 2 deaths occurred among the troops. All the men had been previously vaccinated, and one of the two who died had likewise had small-pox. The deaths occurred in the Royal Artillery and Royal Engineers.

Paroxysmal Fevers show a further decrease on the results of 1860, confirming thereby the belief that the high ratio in 1859 was exceptional.

Continued Fevers have been much less prevalent and fatal than on the average of the two preceding years, but the mortality has been thrice as high as in 1860. The admissions and deaths were distributed in the different corps as follows:—

Corps.	Continued Fevers.					
			Ratio per 1,000 of Strength.			
			1861.		1860.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Royal Artillery	92	4	149	6·48	100	2·68
Royal Engineers	20	3	82	12·24	74	7·07
2nd Battalion 3rd Regiment	90	..	103	..	289	6·98
„ „ 15th „	107	..	125	..	113	3·52
1st „ 22nd „	279	3	331	3·56	..	..
2nd „ „ „	120	5	139	5·78	284	7·19
„ „ 23rd „	65	4	74	4·56	159	3·48
4th „ Rifle Brigade	103	2	118	2·30	296	1·17

It will be seen from this Table that there has been a marked reduction of fever in all the corps except the Royal Artillery, Royal Engineers, and 15th Regiment (in all of which it was previously low), and in the 1st Battalion 22nd Regiment. The latter was omitted from our comparison of the relative amount of fever in the different corps in 1860, because it had only arrived in the Island in the middle of the year. During 1861 it had a very high ratio of admissions by continued fevers, higher, indeed, than any of the corps in the previous year, though not so high as two of them in 1859. The surgeon of the Regiment attributes the prevalence of this disease to over-crowding of the barracks, defective ventilation, unsuitable clothing, extra fatigues, climate, and intemperance. It began to show itself in excess of the usual amount in June, attained its maximum in September, but did not fall to the average till

December. The Regiment during that period was quartered in the Floriana Barracks, in which the 2nd Battalion of the same corps had suffered considerably from fever in the preceding year, and the sanitary condition of which is stated by the Principal Medical Officer in his Report to be "very bad indeed, both as regards situation and ventilation." The 2nd Battalion 3rd Regiment occupied the Lower St. Elmo Barracks, in which fever was so prevalent and fatal in 1859, and had only 90 cases and no deaths; so that the improvements then effected would appear to have been productive of permanent benefit. To prevent the bad effects of over-crowding, however, four companies were sent from these Barracks to Pembroke Camp during the summer, a measure which doubtless contributed to this satisfactory result. The 23rd Regiment, which had the smallest amount of fever, was quartered in the Isola, San Francisco di Paolo, Polverista, and St. Elmo Gate Barracks. The ratio of mortality in the Royal Engineers appears very high, in consequence of the small number of men employed, among whom three deaths occurred. *Malta.*

Dysentery, Diarrhœa, and Cholera have prevailed only to one-third of the average amount, and the same remark applies to *sorethroat* (tonsillitis) and *influenza*.

Ophthalmia has been much more prevalent than during the two preceding years. The excess has taken place in the 3rd, 15th, and 23rd Regiments, in which the admissions were 140, 239, and 137 respectively; while in the Rifle Brigade they amounted only to 8, and in the Royal Artillery to 14. Although the numbers in the 3rd Regiment are high, they show a great reduction upon the admissions in 1860, which were 216. The Surgeon of the Regiment attributes much of this improvement to the removal of four companies to Pembroke Camp in April, immediately after which there was a marked diminution in the number of cases. In the 15th Regiment there was a very great increase in the amount of ophthalmia, compared with 1860, when the numbers were 46. The Surgeon attributes its prevalence to the dark, damp, and ill-ventilated state of some of the barrack-rooms at Fort Ricasoli, and to exposure to the sun's rays. In the 23rd Regiment the surgeon believes the exciting cause of the disease to have been "the quantity of fine dust that floated in the atmosphere in the neighbourhood of the barracks, and more particularly on the road to Polverista, where it lay in heaps on the ground, and on being disturbed by the wind or by the marching of the troops, clouds were raised so dense that it was almost impossible to see. This, no doubt, was the exciting cause, and when the disease once became established, there was everything to favour its continuance and propagation, the men having been crowded together in ill-ventilated rooms, and with very imperfect means of ablution." On Surgeon Tydd's recommendation a water-cart was provided, and the roads in the vicinity of the barracks were watered, after which, he states, the disease began gradually, but steadily, to subside.

Enthetic Diseases.—The reduction in the amount of venereal is very satisfactory, and is stated to have arisen from the greater strictness with which the police regulations have been carried into effect.

Dietic Diseases.—The ratio of admissions by this class of diseases is exactly the same as the average of the two preceding years, but, compared with 1860, there is a reduction to the extent of one-third in the amount of intemperance (*ebriositas*). The reduction has been chiefly in the Royal Artillery, and may probably be accounted for in the same manner as at Gibraltar—the arrival of a Brigade from England to replace one that had served for some years in the Command.

Tubercular Diseases have caused fewer admissions, but a higher ratio of deaths, than in the two preceding years. The mortality, however, has been only half that which occurred on the average of the ten years from 1837 to 1846 inclusive.

Diseases of the Respiratory Organs, and Diseases of the Digestive Organs, both show a considerable reduction in prevalence. In the former the difference has been chiefly in bronchitis, and in the latter in dyspepsia and jaundice. It is worthy of remark that to these diseases and to hepatic inflammation the excess of admissions by these two classes at Gibraltar was attributable. In Malta there was a slight increase in the cases of hepatic inflammation, but not to nearly the same extent as the decrease in those of jaundice.

Diseases of the Integumentary System.—In this class also there has been a great reduction, chiefly in the abscesses and ulcers.

Malta. Violent Deaths.—Seven appear under this head: of these five were by accidents, one by suicide, and one shot by sentence of Court-Martial. Two of the accidental deaths were by drowning, two by fracture, and one by concussion of the brain. The suicide was that of a private of the 2nd Battalion 23rd Regiment, who shot himself through the chest with his rifle.

Corporal Punishment.—The admissions on this account were 15, being in the ratio of 2·4 per 1,000 of the strength, and a little below the average of the two preceding years.

Royal Malta Fencible Artillery.

The average strength of this corps during the year was 605; the admissions into hospital were 506, and the deaths were 5 in, and 1 out of hospital. These numbers give the ratio of 836 admissions, and 9·92 deaths, per 1,000 of the strength.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. IX. of Appendix. The following Table shows the influence of the different classes of diseases upon this Corps and Troops of the Line respectively:—

Orders.	Average Strength.	Royal Malta Fencible Artillery. 605		Annual Ratio per 1,000 of Strength.		1859–60. Ratio per 1,000.		Annual Ratio per 1,000 of Strength. Line Regiments at Malta. 1861.	
	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic diseases	138	1	228·1	1·65	189·2	1·67	349·5	4·20
2	Enthetic „	54	..	89·4	..	56·3	..	102·1	..
3	Dietic „	..	..	..	..	..	..	7·0	..
4	Parasitic „	3	..	4·9	..	4·1	..	12·8	..
	Class II.								
1	Diathetic diseases	..	..	..	..	3·3	..	2·6	..
2	Tubercular „	3	1	4·9	1·65	·8	·82	9·5	3·23
	Class III. Diseases of the—								
1	Nervous system	3	..	4·9	..	12·4	..	15·4	·32
2	Circulatory „	1	..	1·7	..	·8	..	4·7	·65
3	Respiratory „	40	..	66·1	..	76·0	·82	29·4	·81
4	Digestive „	86	..	142·1	..	133 1	·82	35·9	·49
5	Urinary „	..	..	..	..	3·3	..	1·5	·32
6	Reproductive „	3	..	4·9	..	..	..	13·6	..
7	Locomotive „	..	..	..	..	..	..	3·4	..
8	Integumentary „	101	..	166·9	..	128·1	..	109·0	..
	Class IV.								
4	Diseases of Nutrition	..	..	..	..	..	..	..	..
	Class V.								
1	Accidents	74	3	122·4	4·96	75·2	..	73 2	·81
3	Homicide	..	1	..	1·65	..	..	..	..
4	Suicide	..	..	..	..	..	..	..	·16
5	Execution	..	..	..	..	..	..	..	·16
6	Corporal Punishment	..	..	..	..	..	..	2·4	..
	Diseases not stated	..	..	..	..	..	..	..	..
	Total	506	6	836·3	9·91	682·6	4·13	772·0	11·15

This Table shows an increase, both in the sickness and mortality of the corps, compared with the average of the two preceding years, and a ratio of sickness higher than in the line Regiments serving in the same Command. The increase has been chiefly in rheumatism, venereal, and accidents, while there has been a decrease in diseases of the respiratory organs. Compared with Troops of the Line, the Malta Fencible Artillery enjoys an exemption from miasmatic diseases, and also, though to a much less extent than formerly, from venereal, while it has a much higher proportion of admissions by diseases of the respiratory, digestive, and integumentary systems. The cases of dyspepsia alone amounted to 83, or nearly one-sixth of the whole admissions. *Malta.*

III.—Ionian Islands.

No change took place in 1861 in the corps composing the force serving in the Ionian Islands, except the relief of the detachment of the 6th Brigade, Royal Artillery, by the 3rd Brigade, and of the 9th Company, Royal Engineers, by the 30th Company. The average strength was 4,064, the admissions into hospital amounted to 3,548, the deaths in hospital to 41, and out of hospital to 4, and 1 invalid died at sea on his passage home, making a total of 46 deaths. The ratio of admissions, therefore, was 873, and of deaths 11·32 per 1,000 of mean strength, being higher than in the preceding year, but lower than in 1859, and considerably below the average of previous periods. *Ionian Islands.*

The admissions and deaths were distributed as follows in the different corps :—

Regiments.	Mean Strength.	Admitted into Hospital.	Died.				Ratio per 1,000.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery and Engineers ..	606	467	7	2	..	9	771	14·85
2nd Battalion, 2nd Regiment ..	866	740	5	1	1	7	854	8·08
„ 4th „ ..	860	750	10	..	..	10	872	11·63
1st „ 9th „ ..	862	689	15	1	..	16	799	18·56
2nd „ „ „ ..	870	901	4	..	..	4	1,035	4·60

This Table shows the sickness to have been greatest, but the mortality least, in the 2nd Battalion, 9th Regiment; while the ratio of deaths was highest in the 1st Battalion of the same corps, as it had also been in the preceding year.

The diseases by which the admissions into hospital and deaths were caused are detailed in Abstract No. IX. of Appendix, from which, and from previous Reports, the following Table has been compiled :—

an Islands.

Orders.	Diseases.	1861.—Strength, 4,064. Admitted into Hospital.	Deaths. In Ionian Islands.	Deaths. Of Invalids.	Deaths. Total.	Annual Ratio per 1,000 of Strength. Admitted.	Annual Ratio per 1,000 of Strength. Died.	1859–60. Annual Ratio per 1,000 of Strength. Admitted.	1859–60. Annual Ratio per 1,000 of Strength. Died.
	Class I.								
1	Miasmatic diseases ..	1,564	26	1	27	384·8	6·64	299·3	4·38
2	Enthetic „	479	1	..	1	117·9	·25	127·5	..
3	Dietic „	43	1	..	1	10·6	·25	1·4	·13
4	Parasitic „	19	..	..	..	4·7	..	4·8	..
	Class II.								
1	Diathetic diseases.. ..	2	..	..	..	·5	..	1·4	·13
2	Tubercular „	58	5	..	5	14·3	1·23	9·3	1·42
	Class III. Diseases of the—								
1	Nervous system ..	79	1	..	1	19·4	·25	15·8	1·16
2	Circulatory „	21	..	..	..	5·2	..	5·2	·77
3	Respiratory „	187	3	..	3	46·0	·73	51·9	·51
4	Digestive „	198	2	..	2	48·7	·49	39·6	·39
5	Urinary „	4	..	..	..	1·1	..	2·7	..
6	Reproductive „	13	..	..	..	3·2	..	·6	..
7	Locomotive „	16	..	..	..	3·9	..	3·2	·13
8	Integumentary „	494	..	..	..	121·5	..	151·8	..
	Class IV.								
4	Diseases of Nutrition ..	16	..	..	..	3·9	..	4·3	..
	Class V.								
1	Accidents	347	2	..	2	85·4	·49	66·0	·64
3	Homicide	1	1	..	1	·2	·25	..	..
4	Suicide	..	2	..	2	..	·49	..	..
5	Execution	..	1	..	1	..	·25	..	..
6	Corporal Punishment ..	7	..	..	..	1·7	..	2·2	..
	Diseases not specified ..	..	..	..	..	..	..	3·5	..
	Total	3,548	45	1	46	873·0	11·32	790·5	9·66

This Table shows an increase upon the average of the two preceding years both in admissions and deaths, and occurring almost exclusively in miasmatic diseases. There has been a reduction in the diseases of the integumentary system, and also, to a slight extent, in venereal, but the ratio of the latter is exactly the same as in 1860.

Miasmatic Diseases, on being subdivided into the usual groups, furnish the following results :—

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1861.		1859–60.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	..	..	..	..	12·5	·26
Paroxysmal „	124	3	30·5	·73	32·7	·26
Continued „	863	23	212·3	5·96	115·9	3·73
Dysentery, Diarrhœa, and Cholera	215	..	52·9	..	42·5	·13
Sorethroat and Influenza ..	84	..	20·7	..	23·1	..
Ophthalmia	149	..	36·7	..	32·8	..
Rheumatism	91	..	22·4	..	29·0	..

Eruptive Fevers, which prevailed to a considerable extent in 1859 and 1860, though confined almost exclusively to one regiment, entirely disappeared before the beginning of 1861, and during that year they did not occasion a single admission among the troops.

Paroxysmal Fevers.—The ratio of admissions by this form of fever has been nearly the same as the average of the two preceding years, but only half that of 1860. A large proportion of the cases occurred, as in that year, in the 2nd Battalion 2nd Regiment.

Continued Fevers have been greatly in excess of the previous average, the admissions having amounted to 212 per 1,000 of the strength. The excess was chiefly in the 2nd Battalion 9th Regiment, at Argostoli in Cephalonia, and the 2nd Battalion 4th Regiment, quartered in Fort Neuf, Corfu. The 2nd Battalion 2nd Regiment, in the citadel, Corfu, had also a considerable number of cases, while the Royal Artillery and Engineers were remarkably exempt. In the 1st Battalion 9th Regiment, quartered in the Old Venetian Barracks, Corfu, fever also became very prevalent ; but it immediately abated on the removal of a large detachment to Vido in the end of July. In Corfu the disease began to prevail in June, attained its maximum in August, and had subsided by the end of September. The medical officers concur in attributing its prevalence to the overcrowded state and defective ventilation of the barracks, and to the generally defective sanitary condition of the town. These views are borne out by the facts of the greater amount of fever in the Fort Neuf Barracks, which are situated at the spot where one of the largest town drains empties itself into the tideless harbour, and of the subsidence of fever in the 1st Battalion 9th Regiment, as soon as the overcrowding was relieved by the removal of a large detachment to Vido. In Cephalonia fever broke out among the troops early in July and continued till the beginning of October. In an average strength of 543 men there were 258 cases in three months, but none of them terminated fatally. The first cases occurred in the band of the regiment, which occupied the ground floor in the Moscopoli Barrack, and it then broke out in the new North Barrack. These are both hired houses, and the drainage of them is described as most defective. The disease among the men of the band was believed to be purely of local origin, and to have been caused by the drains passing directly under the rooms. The band was removed to the second floor in the same house, "with almost immediate benefit," room being obtained for them by encamping a portion of the regiment.

The deaths by continued fevers all occurred at Corfu ; 9 were in the 2nd Battalion 4th Regiment, 7 in the 1st Battalion 9th, 4 in the 2nd Battalion 2nd, 2 in the Royal Artillery, and 1 in the Royal Engineers. Although the cases were so numerous in Cephalonia, they were of a mild type, and all recovered.

Dysentery, Diarrhœa, and Cholera. were more prevalent than in the preceding years, the excess being chiefly in the 1st Battalion 9th Regiment, in which 105 cases of diarrhœa and 6 of dysentery occurred, being more than half of the admissions by these diseases.

Enthetic Diseases have been rather under the average of the two preceding years, but the ratio is exactly the same as in 1860.

Dietic Diseases show a considerable increase upon the results of 1860, the

Ionian Islands. difference being caused by the admissions for intemperance (*ebriositas*). Under this head 41 cases and 1 death appear. Of the admissions, 18 occurred in the 4th Regiment: the death was that of an Artilleryman, from the effects of a large draught of spirits.

Tubercular Diseases have given rise to a higher ratio of admissions than formerly, but the deaths remain nearly the same.

Violent Deaths.—These were 6 in number, of which 2 were accidental, 1 homicidal, 2 suicidal, and 1 public execution. One of the accidental was by drowning in the citadel ditch; the other was by traumatic tetanus in a gunner of the Royal Artillery, at Santa Maura, caused by a splinter of wood an inch and a half in length penetrating the sole of his right foot. Tetanic symptoms set in on the fourth day, and he died in thirty-six hours from their first appearance. The death by homicide was that of a corporal of the 1st Battalion, 9th Regiment, shot by a private of the same corps, who was hanged for the murder. The suicides occurred in the Royal Artillery, and 1st Battalion, 9th Regiment.

Corporal Punishment has given rise to 7 admissions, being under the previous average.

The following Table shows the distribution of the sickness and mortality in the different islands:—

	Average Strength.	Admissions into Hospital.	Total Deaths.	Annual Ratio per 1,000.	
				Admitted.	Died.
Corfu and Vido	2,956	2,444	41	827	14·19
Paxo	34	36	..	1,059	..
Santa Maura	125	62	1	496	8·00
Cephalonia	546	633	2	1,159	3·66
Zante	318	282	..	887	..
Ithaca	63	66	1	1,048	15·87
Cerigo	32	19	..	594	..

The results for Corfu very closely approximate those stated in the Report for 1859, while Santa Maura and Zante show a considerable reduction, and Cephalonia an increase in the admissions. The classes of diseases by which the sickness and mortality were caused at the three principal stations of the troops, are shown in the following Table, compiled from the Quarterly Returns:—

Order.	Stations / Strength / Diseases.	Corfu. 2,956. Admitted.	Died.	Annual Ratio per 1,000. Admitted.	Died.	Cephalonia. 546. Admitted.	Died.	Annual Ratio per 1,000. Admitted.	Died.	Zante. 318. Admitted.	Died.	Annual Ratio per 1,000. Admitted.	Died.
	Class I.												
1	Miasmatic diseases ..	1,009	26	341·3	8·79	374	..	685·0	..	83	..	261·0	..
2	Enthetic „ ..	324	1	109·6	·34	59	..	108·1	..	73	..	229·6	..
3	Dietic .. „ ..	41	1	13·9	·34	1	..	1·8	..	2	..	6·3	..
4	Parasitic „ ..	15	..	5·1	..	2	..	3·7	..	1	..	3·1	..
	Class II.												
1	Diathetic diseases ..	1	..	·3	..	..	1	..	1·83	1	..	3·1	..
2	Tubercular „ ..	46	3	15·6	1·01	7	1	12·8	1·83	1	..	3·1	..
	Class III. Diseases of the—												
1	Nervous system ..	58	1	19·6	·34	6	..	11·0	..	11	..	34·6	..
2	Circulatory „ ..	17	..	5·7	..	4	..	7·2	..	1	..	3·1	..
3	Respiratory „ ..	162	2	54·8	·68	5	..	9·1	..	14	..	44·0	..
4	Digestive „ ..	159	2	53·8	·68	22	..	40·3	..	10	..	31·4	..
5	Urinary „ ..	3	..	1·0	..	1	..	1·8	..	1	..	3·1	..
6	Reproductive „ ..	16	..	5·4	..	2	..	3·7	..	1	..	3·1	..
7	Locomotive „ ..	14	..	4·7	..	2	..	3·7	..	1	..	3·1	..
8	Integumentary „ ..	333	..	112·6	..	81	..	148·4	..	45	..	141·5	..
	Class IV.												
4	Diseases of Nutrition .	18	..	6·1	..	..	..	..	..	1	..	3·1	..
	Class V.												
1	Accidents	214	2	72·4	·68	66	..	120·9	..	35	..	110·1	..
3	Homicide	..	1	..	·34	..	..	..	..	..	..	..	..
4	Suicide	1	1	·3	·34	..	..	..	..	..	..	..	..
5	Execution	..	1	..	·34	..	..	..	..	..	..	..	..
6	Corporal Punishment.	5	..	1·7	..	1	..	1·8	..	1	..	3·1	..
	Diseases not specified.	8	..	2·7	..	..	..	..	..	..	..	..	..
	Total	2,444	41	826·6	13·88	633	2	1159·3	3·66	282	..	886·4	..

This Table presents nearly the same leading features as were shown in the Report for 1859 with regard to the relative prevalence of the different classes of diseases. The excess of miasmatic diseases in Cephalonia is more marked than formerly, owing to the prevalence of fever already noticed. The exemption from diseases of the nervous and respiratory system in Cephalonia, and the greater prevalence of venereal in Zante, still remain leading characteristics; but there has been an increase in Corfu and a decrease in Zante in the admissions by diseases of the digestive system.

From the smallness of the force, however, except in Corfu, considerable fluctuations must be expected; and it would be imprudent to draw any positive deductions, except upon the observations of a series of years.

Mediterranean.

Section II.

On the Extent of Invaliding among the Troops serving in the Mediterranean.

During the year, 51 men were sent to England from Gibraltar, 57 from Malta, and 74 from the Ionian Islands, recommended for discharge from the service as invalids; and 126 from Gibraltar, 54 from Malta, and 28 from the Ionian Islands, were sent for change of climate. The diseases which occasioned their being sent home are classed in the following Table compiled from Abstract No. X. of Appendix :—

	Gibraltar.		Malta.		Ionian Islands.	
	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.
Continued Fevers	..	18	..	..	..	1
Dysentery and Diarrhœa	..	1	..	1	1	1
Ophthalmia	1	9	8	10	..	2
Rheumatism	4	14	4	2	4	4
Venereal Diseases	2	4	..	3	4	1
Dietic „	..	..	..	..	..	1
Diathetic „	..	..	1	..	..	..
Tubercular „	12	21	10	12	14	7
Diseases of the—						
Nervous system	15	10	10	6	15	6
Circulatory „	4	1	5	5	7	..
Respiratory „	1	21	2	4	6	2
Digestive „	1	9	3	7	7	..
Urinary „	..	1	..	1	1	..
Reproductive „	..	1	..	1	..	..
Locomotive „	..	2	2	1	4	3
Integumentary „	5	..	..	..	3	..
Malformations	1	..	..	..	4	..
Diseases of Nutrition	2	12	..	..	4	..
Accidents, &c.	3	2	3	1	..	..
Worn out	..	..	9	..	..	..
Total	51	126	57	54	74	28
Ratio per 1,000 of Mean Strength	9·2	22·8	9·2	8·7	18·2	6·9

The most important point in this Table is the number of men sent home on account of tubercular diseases, almost all being cases of consumption. Diseases of the nervous system also furnish a large number. The circumstance that no men have been sent home from Malta for change of climate after fever, may probably be due to the great benefit derived in such cases from the establishment of the Sanatorium at Citta Vecchia.

The number of invalids from the Mediterranean actually discharged the service in 1861, was 238, of whom 126 were from Gibraltar, 57 from Malta, and 55 from the Ionian Islands. In this number are of course included invalids who returned to England in 1860, but were not discharged till after the close of that year.

The disabilities of the men discharged as invalids are shown in the following Table :—

Invalids from	Gibraltar.	Malta.	Ionian Islands.	Total Mediterranean Commands.
Rheumatism	4	..	..	4
Venereal	2	4	1	7
Weakly Constitution	..	..	2	2
Cachexy and Scrofula	6	2	..	8
Pulmonary Disease	48	14	22	84
Mental Disease	9	3	8	20
Paralysis	3	2	3	8
Epilepsy	1	4	2	7
Deafness	1	1	2	4
Diseases of the Eye	11	15	4	30
Cardiac and Aortic Disease	14	4	3	21
Dysentery and Hepatic Disease	10	3	..	13
Hernia	1	..	..	1
Stricture and Urinary Disease	4	2	1	7
Contractions	3	1	3	7
Loss and Impaired Use of Limbs	7	..	2	9
Ulcers and Varices	..	..	1	1
Dislocations	1	2	..	3
Contusion	1	..	..	1
Worn-out	..	..	1	1
Total	126	57	55	238
Ratio per 1,000 of Mean Strength	22·8	9·2	13·5	15·1
,, ,, 1859–60	10·	7·1	8·4	8·5

Mediterranean

From this Table it appears that the invalids discharged in 1861 have been nearly double the average of the two preceding years, and this increase has been more marked in the numbers from Gibraltar than from the other two Commands. As formerly noticed, Gibraltar contributes a high ratio of invalids from pulmonary and also from cardiac disease, and the proportion from dysentery and hepatic disease is likewise high.

Section III.

Mean Daily Sick.

The average number constantly sick, the average sick time to each soldier, and the average duration of the cases in hospital in each of the Mediterranean Commands during the year 1861, are shown in the following Table :—

	Gibraltar.	Malta, exclusive of Royal Malta Fencibles.	Ionian Islands.	United Kingdom. Infantry Regiments. Average of two years, 1860–61.
Average Strength in 1861	5,520	6,185	3,548	
Average constantly sick in 1861	263	301	153	
Ratio per 1,000 constantly sick — 1861	47·64	48·67	43·12	47·11
Ratio per 1,000 constantly sick — 1859–60	43·58	49·47	42·28	
	days	days	days	days
Average sick time to each Soldier — 1861	17·39	17·76	15·74	17·19
Average sick time to each Soldier — 1859–60	15·91	18·05	15·43	
Average duration of the cases of disease — 1861	18·75	23·01	18·03	19·64
Average duration of the cases of disease — 1859–60	17 99	16·57	19·52	

Mediterranean. From this it appears that the average constantly non-effective from sickness in Gibraltar has been higher than in the two preceding years, while in Malta and the Ionian Islands it has been very nearly as before. In Malta the duration of the cases has been considerably greater than formerly. The results in Gibraltar and Malta, except on this point, closely approximate the average for Infantry regiments serving at home, while in the Ionian Islands they are considerably under that average.

Section IV.

On the Influence of Age on Mortality.

The details respecting the number serving, and the deaths at different ages, of the troops in the Mediterranean, will be found in Abstract No. XI of Appendix. The results are shown in the following Table:—

		Ratio of Deaths per 1,000 of Strength at each Age.					
		Under 20.	20-24.	25-29.	30-34.	35-39.	40 and upwards.
Mediterranean Commands	1861	7·46	7·42	12·28	7·70	13·19	58·82
	1859-60	7·22	9·88	16·59	16·67	10·94	17·24

This Table shows a considerable increase in the mortality after 25 years of age—greater than is found to occur in civil life. The numbers under observation are, however, still too small to ensure regularity in the results.

III.—ON THE HEALTH OF THE TROOPS SERVING IN BRITISH AMERICA.

Section I.

Sickness and Mortality.

I. Bermuda.

Bermuda. During the year the garrison of Bermuda remained unchanged, except that the company of Royal Engineers was, in the beginning of December, relieved by one from England; it consisted of Royal Artillery, Royal Engineers, and the service companies of the 39th Regiment.

The average strength of the troops in 1861 was 1,010, the admissions into hospital amounted to 466, and the deaths in hospital to 9, out of hospital to 4, and of invalids 1, making a total of 14. These numbers give a ratio of 461 admissions and 13·86 deaths per 1,000 of the strength, the former being considerably below, and the latter above the average of the two preceding years.

The diseases by which the admissions and deaths were caused, are detailed in Abstract No. XII of Appendix. The following Table shows the influence of the different classes of diseases on the health of the troops:—

Orders.	Diseases.	Average Strength, 1,010. Admitted into Hospital.	Died. At Bermuda.	Died. Of Invalids.	Died. Total.	Annual ratio per 1,000. 1861. Admitted.	1861. Died.	1859—60. Admitted.	1859—60. Died.
	Class I.								
1	Miasmatic Diseases.. ..	122	..	..	..	120·8	..	217·8	1·41
2	Enthetic „	56	..	..	..	55·4	..	59·7	..
3	Dietic „	19	..	..	..	18·8	..	11·8	..
4	Parasitic „	5	..	..	..	4·9	..	5·6	..
	Class II.								
1	Diathetic Diseases	..	..	..	..	..	..	1·9	..
2	Tubercular „	6	1	1	2	5·9	1·98	8·0	2·82
	Class III. Diseases of the—								
1	Nervous system	20	5	..	5	19·8	4·95	21·6	2·82
2	Circulatory „	4	2	..	2	3·9	1·98	3.8	..
3	Respiratory „	33	..	..	..	32·7	..	54·6	..
4	Digestive „	51	1	..	1	50·5	·99	69·6	1·41
5	Urinary „	1	..	..	..	1·0	..	·9	..
6	Reproductive „	14	..	..	..	13·9	..	1·4	..
7	Locomotive „	3	..	..	..	3·0	..	4·2	..
8	Integumentary„	61	..	..	..	60·4	..	100·7	..
	Class IV.								
4	Diseases of Nutrition ..	1	..	..	..	1·0	..	3·3	..
	Class V.								
1	Accidents	62	1	..	1	61·4	·99	73·9	1·88
4	Suicide	..	3	..	3	..	2·97	..	·94
6	Corporal Punishment ..	2	..	..	..	2.0	..	·9	..
	Diseases not specified ..	3	..	..	..	3·0	..	3·8	..
	No appreciable disease ..	3	..	..	..	3·0	..	..	..
	Total.. ..	466	13	1	14	461·4	13·86	643·5	11·28

This Table shows a great reduction in the admissions compared with the average of the two preceding years, chiefly in miasmatic diseases, and also, though to a less extent, in those of the respiratory, digestive, and integumentary systems, and in accidents. The reduction, however, is probably rather overstated; for, in consequence of a misunderstanding between the naval and military authorities at Ireland Island, the sick of the troops were not admitted into the Naval Hospital there during the greater part of the first two quarters of the year. During that period, the sick of the detachments there and at Hamilton were sent to hospital at St. George's; but the Principal Medical Officer states, "there were a few trifling cases treated in barracks at Ireland Island." Making allowance, however, for this, the results as regards the admissions have been very satisfactory. The mortality has been higher than the previous average, and a large proportion of it has unfortunately been the result of intemperance, 4 of the deaths having been from delirium tremens, and 3 by suicide.

Miasmatic Diseases, when subdivided into groups, furnish the following results :—

ermuda.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Strength. 1861. Admitted.	1861. Died.	1859-60. Admitted.	1859-60. Died.
Paroxysmal Fevers..	..	..	..	..	1·9	·47
Continued „	3	..	3·0	..	103·5	·94
Dysentery, Diarrhœa, and Cholera ..	45	..	44·5	..	45·6	..
Sorethroat and Influenza	10	..	9·9	..	6·1	..
Ophthalmia..	31	..	30·7	..	37·2	..
Rheumatism	26	..	25·7	..	21·6	..

From this it appears that the reduction in the amount of miasmatic diseases was almost exclusively in the continued fevers. In 1860 an epidemic of fever prevailed among the troops throughout the island, 209 cases having occurred, but without any deaths, while in 1861 there were only 3 admissions by fever from nearly the same number of men.

Dietic Diseases.—Under this class appear 19 cases of intemperance (*ebriositas*), of which 2 were from the Royal Engineers, and 17 from the 39th Regiment. In addition to these, there were in the class of—

Diseases of the Nervous System, 10 cases of *delirium tremens*, of which 4 terminated fatally Three of the cases occurred in the Royal Engineers, and 7, including all the fatal cases, in the 39th Regiment.

Violent Deaths.—These were 4 in number, and all occurred in the 39th Regiment. One was by accidental drowning at Ireland Island, and the others were suicidal, 2 by hanging, and 1 by cutting his throat.

The other classes do not appear to call for any remarks.

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va Scotia d New unswick.

II. Nova Scotia and New Brunswick.

The force employed in Nova Scotia and New Brunswick remained the same as in 1860. In the middle of May two companies of the 62nd Regiment were detached to St. John's, Newfoundland, but one of them returned at the end of a fortnight. This detachment has been included with the troops in Nova Scotia; but, as in former reports, the sickness and mortality of the Royal Newfoundland Companies are kept separate.

The mean strength of the troops during 1861 was 1,725, exclusive of the Royal Newfoundland Companies; the admissions into hospital amounted to 1,012, and the deaths to 13, of which 8 occurred in hospital, 3 out of it, and 2 among invalids. The annual ratio of admissions, therefore, was 587, and of deaths 7·53 per 1,000 of mean strength.

The proportion in each of the corps was as follows:—

	Mean Strength.	Admitted into Hospital.	Died. In Hospital.	Died. Out of Hospital.	Died. Of Invalids.	Died. Total.	Annual ratio per 1,000. Admitted.	Annual ratio per 1,000. Died.
Royal Artillery.. ..	212	213	1	1	..	2	1,005	9·43
„ Engineers ..	82	82	..	..	..	..	1,000	..
62nd Regiment.. ..	712	337	..	2	1	3	473	4·21
63rd „	719	380	7	..	1	8	528	11·12

As in previous reports, the amount of sickness is found to be considerably higher in the Ordnance than in either of the two regiments. The mortality in the 63rd Regiment has been higher than in the other corps. *Nova Scotia and New Brunswick.*

The influence of the different classes of diseases on the sickness and mortality, are shown in the following Table, compiled from Abstract No. XII. of Appendix, and from previous Reports :—

Orders.	Diseases.	Strength, 1,725.				Annual Ratio per 1,000.			
			Deaths.			1861.		1859-60.	
		Admissions.	In Nova Scotia.	Of Invalids.	Total.	Admissions.	Deaths.	Admissions.	Deaths.
	Class I.								
1	Miasmatic Diseases ..	187	1	..	1	108·4	·58	92·1	..
2	Enthetic „	151	..	..	..	87·5	..	120·1	..
3	Dietic „	39	..	..	..	22·6	..	7·3	·28
4	Parasitic „	11	..	..	..	6·4	..	2·2	..
	Class II.								
1	Diathetic Diseases ..	..	..	..	..	..	..	1·7	..
2	Tubercular „ ..	27	2	2	4	15·7	2·32	20·1	2·83
	Class III.								
	Diseases of the—								
1	Nervous system.. ..	24	3	..	3	13·9	1·74	14·7	..
2	Circulatory „	8	1	..	1	4·6	·58	3·1	·28
3	Respiratory „	144	2	..	2	83·5	1·15	82·5	1·13
4	Digestive „	66	1	..	1	38·3	·58	38·1	·56
5	Urinary „	13	..	..	..	7·5	..	2·2	..
6	Reproductive „	4	..	..	..	2·3	..	2·8	..
7	Locomotive „	7	..	..	..	4·1	..	3·4	..
8	Integumentary „	119	..	..	..	69·0	..	73·3	..
	Class IV.								
4	Diseases of Nutrition ..	..	..	..	..	..	..	·3	..
	Class V.								
1	Accidents	212	..	..	..	122·9	..	103·1	1·13
4	Suicide	..	1	..	1	..	·58	..	..
6	Corporal Punishment ..	..	..	..	..	..	..	·8	..
	Diseases not stated ..	..	..	..	..	..	..	5·9	..
	Total.. ..	1,012	11	2	13	586·7	7·53	573·7	6·21

The most striking points in this Table are the reduction in miasmatic and venereal, and the increase in dietic diseases. There is also a reduction in tubercular diseases; but this may possibly have been in some degree due to the extent of invaliding.

Miasmatic Diseases, when subdivided, give the following results: —

Nova Scotia and New Brunswick.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength. 1861. Admitted.	1861. Died.	1859-60. Admitted.	1859-60. Died.
Eruptive Fevers	6	1	3·5	·58	1·4	..
Paroxysmal „	..	..	..	..	·3	..
Continued „	13	..	7·5	..	9·0	..
Dysentery, Diarrhœa, and Cholera ..	30	..	17·4	..	17·5	..
Sorethroat and Influenza	46	..	26·7	..	21·2	..
Ophthalmia	34	..	19·7	..	13·0	..
Rheumatism	43	..	24·9	..	23·2	..

The increase in this class of diseases appears from this Table to have been chiefly in sorethroat (*tonsillitis*) and influenza, ophthalmia, and, though to a less extent, eruptive fevers. The whole of the admissions in the last group were by small-pox, which prevailed as an epidemic among the civil population of Halifax and of St. John's, Newfoundland, for several months. Five of the admissions were at Halifax, and the other in the detachment at St. John's, Newfoundland. The death occurred in the Artillery. Of the 34 cases of ophthalmia, 19 were in the 63rd Regiment.

Dietic Diseases have been thrice as common as on the average of the two preceding years. All the admissions were under the head of intemperance (*ebriositas*); 10 were in the Royal Artillery, 9 in the Royal Engineers, 12 in the 62nd, and 8 in the 63rd Regiment, being in the ratio of 47, 110, 17, and 11 per 1,000 of the strength in each of these corps respectively.

The other classes of diseases do not seem to require special remark, as the results so closely approximate the average.

The death by suicide was that of a gunner of the Royal Artillery, who hanged himself in the regimental cells at Halifax while a prisoner for drunkenness.

III. Canada.

Canada.

In the beginning of July the force in Canada was augmented by the arrival of a battery of the 4th Brigade Royal Artillery, the 30th and 47th Regiments, and the 4th Battalion 60th Regiment.

The average strength of the troops throughout the year was 3,503; the admissions into hospital were 2,090; and the deaths, in hospital, 21, and out of hospital, 12, making a total of 33. These numbers give an annual ratio of 597 admissions, and 9·42 deaths per 1,000 of mean strength.

The sickness and mortality were distributed in the different corps as follows:—

	Mean Annual Strength.	Admitted into Hospital.	Died. In Hospital.	Died. Out of Hospital.	Died. Total.	Annual Ratio per 1,000 of Strength. Admitted.	Annual Ratio per 1,000 of Strength. Died.
Royal Artillery	326	291	3	2	5	893	15·34
1st Batt., 17th Regiment ..	819	419	5	..	5	512	6·10
30th Regiment	430	290	1	2	3	674	6·98
47th „	428	424	..	..	..	991	..
4th Batt., 60th Regiment ..	430	245	2	2	4	570	9·30
Royal Canadian Rifles ..	1,070	421	10	6	16	393	14·95

This shows a very high rate of mortality in the Royal Artillery and Canadian Rifles; but 2 of the deaths in the former and 3 in the latter, were by accidental drowning. The admissions into hospital were comparatively very high in the 47th Regiment, and low in the Canadian Rifles; but the latter corps is much broken up into small detachments, so that probably the number of cases may be understated, and the proportion of married men in it is also very large.

The diseases by which the admissions into hospital and deaths were caused, are detailed in Abstract No. XII. of Appendix, from which and previous Reports the following Table has been compiled:—

Orders.	Diseases.	Strength, 3,503.		Annual Ratio per 1,000.			
				1861.		1859-60.	
		Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
	Class I.						
1	Miasmatic diseases.. ..	448	2	127·9	·57	114·2	1·64
2	Enthatic „	453	..	129·3	..	106·7	..
3	Dietic „	78	1	22·3	·285	25·0	·20
4	Parasitic „	34	..	9·7	..	2·4	..
	Class II.						
1	Diathetic diseases	..	..	..	..	2·9	..
2	Tubercular „	19	3	5·4	·86	6·9	2·04
	Class III. Diseases of the						
1	Nervous system	50	5	14·3	1·43	18·3	1·23
2	Circulatory „	9	2	2·6	·57	4·7	1·42
3	Respiratory „	211	5	60·2	1·43	76·6	2·24
4	Digestive „	126	1	35·9	·285	34·3	·40
5	Urinary „	9	1	2·6	·285	3·1	..
6	Reproductive „	24	..	6·8	..	2·0	..
7	Locomotive „	9	..	2·6	..	2·4	..
8	Integumentary „	290	..	82·8	..	65·2	..
	Class IV.						
4	Diseases of Nutrition ..	2	..	·6	..	1·4	..
	Class V.						
1	Accidents	322	12	91·9	3·42	74·1	·81
3	Homicide	..	..	..	..	..	·20
4	Suicide	..	1	..	·285	..	·20
6	Corporal Punishment ..	6	..	1·7	..	·8	..
	Diseases not specified ..	..	..	..	..	1·4	..
	Total	2,090	33	596·6	9·42	542·4	10·38

This Table shows an increase in the admissions, and a very slight reduction in the deaths, compared with the average of the two preceding years. The increase has been chiefly in miasmatic and venereal diseases, in those of the integumentary system, and in accidents.

Miasmatic Diseases have given rise to rather above the average number of admissions. The influence of the various groups included in this class is shown in the following Table:—

Canada.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength. 1861. Admitted.	1861. Died.	1859-60. Admitted.	1859-60. Died.
Eruptive Fevers	5	..	1·4	..	·8	·20
Paroxysmal „	13	..	3·7	..	3·7	..
Continued „	49	2	14·0	·57	17·1	·82
Dysentery, Diarrhœa, and Cholera ..	170	..	48·5	..	24·4	..
Sorethroat and Influenza	68	..	19·4	..	10·4	..
Ophthalmia	37	..	10·6	..	25·0	..
Rheumatism	80	..	22·8	..	27·9	·20

From this Table it appears that the increase in the admissions by this class has been confined to dysentery, diarrhœa, and cholera, and to sorethroat and influenza, while there has been a decrease in continued fevers, ophthalmia, and rheumatism. Diarrhœa prevailed to a considerable extent, but in a very mild form, in the 30th and 47th Regiments, immediately after their arrival in the command, 33 cases having been admitted in the former, and 77 in the latter during the first three months thereafter. The Medical Officer in charge of the 47th Regiment states in his report, that "the disease is supposed to have been caused by the sudden change in the mode of life of the men after landing from on board ship, by the heat and dampness of the weather, and by the too free use of fermented liquors."

Enthetic Diseases have been more prevalent than in the previous years, but are still lower than in most of the colonies. If, however, the Royal Canadian Rifle Corps, which has a large proportion of married men serving in it, be deducted, the ratio of admissions by venereal will be found to have amounted to 180 per 1,000 of the strength.

Dietic Diseases.—In this class there were 78 admissions, of which 1 was by land scurvy, and 77 by intemperance (*ebriositas*); 40 of the latter occurred in the Canadian Rifles, a number which, though still very high, is one-third less than appeared in the Returns of 1860.

Tubercular Diseases show a great reduction in the mortality; but this may probably depend upon the arrival of so large a portion of the force during the year from England, as the regiments must doubtless, prior to embarkation, have been weeded of all men labouring under pulmonary symptoms.

Violent Deaths.—These amounted to 13, or upwards of one-third of the total mortality; 9 were caused by drowning, 1 by fracture of the skull from a blow given accidentally, 1 by fracture of the ribs from a fall into the hold of a ship, and 1 by an accident with fire-arms. The remaining one was suicidal; it was that of a private of the 17th Regiment, who, in a state of intoxication, threw himself out of a window 20 feet from the ground, and fractured his spine, ribs, and clavicle. He died about an hour afterwards.

Corporal Punishment was inflicted in six instances, being in the ratio of 1·7 per 1,000 of the strength, or almost identical with that among infantry regiments serving in the United Kingdom.

Newfoundland.

IV.—Newfoundland.

The average strength of the Royal Newfoundland Companies during the year was 196; the admissions into hospital were 127, and the total deaths, 2. These numbers give the proportion of 648 admissions and 10·2 deaths per 1,000 of mean strength, the former being about half, and the latter four times the average of the two preceding years.

The following Table, prepared from Abstract No. XII. of Appendix, shows the influence of the different classes of diseases upon this corps:—

Orders.	Diseases.	Strength, 196.		Annual Ratio per 1,000.					
				1861.		1859-60.		Nova Scotia, &c. 1861.	
		Admissions.	Total Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
	Class I.								
1	Miasmatic diseases..	60	..	306·1	..	556·6	..	108·4	·58
2	Enthetic „ ..	3	..	15·3	..	25·9	..	87·5	..
3	Dietic „ ..	4	..	20·4	..	47·2	..	22·6	..
4	Parasitic „ ..	..	..	..	..	4·7	..	6·4	..
	Class II.								
1	Diathetic diseases ..	2	..	10·2	..	9·4	..	..	..
2	Tubercular „ ..	..	..	..	..	23·6	..	15·7	1·74
	Class III. Diseases of the—								
1	Nervous system ..	6	..	30·6	..	82·5	2·35	13·9	1·74
2	Circulatory „ ..	..	..	..	..	54·2	..	4·6	·58
3	Respiratory „ ..	9	2	45·9	10·2	172·3	..	83·5	1·15
4	Digestive „ ..	6	..	30·6	..	87·3	..	38·3	·58
5	Urinary „ ..	..	..	..	..	2·4	..	7·5	..
6	Reproductive „ ..	1	..	5·1	..	2·4	..	2·3	..
7	Locomotive „ ..	3	..	15·3	..	11·8	..	4·1	..
8	Integumentary „ ..	17	..	86·7	..	82·5	..	69·0	..
	Class V.								
1	Accidents	15	..	76·5	..	191·0	..	122·9	..
4	Suicide	..	..	..	..	..	..	..	·58
6	Corporal Punishment	..	..	..	..	7·1	..	..	..
	Diseases not stated..	1	..	5·1	..	9·4	..	..	..
	Total	127	2	647·8	10·2	1370·3	2·35	586·7	6·95

The most striking points in this Table are the reduction in the admissions by miasmatic diseases, which, however, are still nearly thrice as numerous as in Nova Scotia, the very small amount of venereal, the marked diminution in diseases of the respiratory organs, and the absence of tubercular diseases. The latter circumstance may, however, be due to the large number of men discharged from the regiment in the colony or sent to England, amounting during the year to 51, or one-fourth of the strength. It is obviously impossible to draw deductions with regard to a force in which such extensive changes have taken place. The great preponderance of miasmatic diseases has been due to sorethroat and influenza, of which there were 25 cases, and rheumatism, of which there were 18, amounting together to one-third of all the admissions.

Seven cases of diphtheria are returned, all of which recovered. The disease is stated to have been epidemic at the time in the town of St. John's.

There were only 4 cases returned under the head of intemperance (*ebriositas*), and none under *delirium tremens*, a marked improvement upon the returns of 1860, when there were 19 of the former and 4 of the latter.

V. British Columbia.

The returns from this colony continue to show a remarkably healthy condition of the troops—a detachment of the Royal Engineers. During the year there were only 97 admissions into hospital and 1 death in a force of 130 men, being in the ratio of 746 and 7·69 per 1,000: 22 of the cases were influenza, 22 venereal, and 24 wounds and injuries mostly received in the discharge of

British Columbia. their duties. The death was that of a Sapper, who was frozen to death while returning to head quarters from a surveying expedition. The diseases which caused the admissions into hospital are detailed in Abstract No. XII. of Appendix.

Section II.

On the Extent of Invaliding.

British America. The number of invalids sent home was considerably less than in 1860. The following Table, prepared from Abstract No. XIII. of Appendix, shows the influence of the different classes of diseases as causes of invaliding:—

Invalids sent Home.	Bermuda.		Nova Scotia, &c.		Canada.		Newfoundland		British Columbia.
	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.	
Miasmatic diseases	..	..	3	4	7	2	..	1	None
Dietic „	..	..	..	..	..	1	..	..	
Tubercular „	3	2	..	11	2	..	1	..	
Diseases of Nervous system ..	1	..	6	1	10	..	3	..	
„ Circulatory „ ..	1	..	2	..	5	..	..	..	
„ Respiratory „ ..	..	1	..	5	3	2	..	1	
„ Urinary „ ..	..	..	..	1	..	2	..	..	
„ Reproductive „ ..	..	..	..	1	..	..	..	..	
„ Locomotive „ ..	1	..	1	..	..	..	..	..	
„ Nutrition	1	..	..	1	..	..	..	..	
Accidents and Violence.. ..	..	1	4	..	1	..	..	..	
Total	7	4	16	24	28	7	4	2	
Annual ratio per 1,000 of strength { 1861 ..	6·9	3·9	9·3	13·9	8·	2·	20·4	10·2	
{ 1860 ..	5·7	19·	31·6	5·2	15·5	5·2	..	13·9	

The most striking point in this Table is the large number of men sent home from Nova Scotia for change of climate on account of tubercular diseases, and from Canada for discharge on account of diseases of the nervous system. Of the latter, 7 were labouring under mental derangement.

The numbers actually discharged the service as invalids from the American Commands during 1861, were as follows:—

Diseases.	Bermuda.	Nova Scotia and New Brunswick.	Canada.	Newfoundland.
Rheumatism and Chronic Pains ..	1	..	5	17
Ophthalmia	..	1	2	..
Pulmonary Disease	8	..	16	..
Paralysis	..	..	1	..
Epilepsy	..	..	2	..
Deafness	..	..	2	..
Mental Disease	..	1	8	..
Cardiac „	..	..	6	..
Stricture	..	..	1	..
Contractions	..	..	2	..
Loss and impaired use of, and disease of limb	..	..	3	..
Total ..	9	2	48	17
Ratio per 1,000 of Strength.. ..	8·9	1·15	13·68	86·7
„ „ 1860 ..	6·6	7·5	14·7	69·8

The very high proportion of men from Newfoundland discharged the service, arises, as pointed out in last Report, from the nature of the force employed there, consisting entirely of men who had served for many years previously to joining the Newfoundland Corps. The large number from Canada discharged for pulmonary diseases, may partly account for the reduced proportion of deaths by consumption noticed in the preceding remarks. *British America.*

Section III.

Mean Daily Sick.

The average number throughout the year constantly non-effective from sickness was, in Bermuda, 25, Nova Scotia and New Brunswick, 42, Canada, 95, and Newfoundland, 7. From these numbers the following results are obtained:—

	Bermuda.		Nova Scotia and New Brunswick.		Canada.		Newfoundland.	
	1861.	1859-60.	1861.	1859-60.	1861.	1859-60.	1861.	1859-60.
Ratio per 1,000 of strength constantly sick ..	24·75	37·16	24·34	26·27	27·12	29·12	35·71	42·45
Average sick time to each soldier	days 9·03	days 13·56	days 8·89	days 9·59	days 9·90	days 10·63	days 13·04	days 15·49
Average duration of the cases of disease	19·58	21·08	15·15	16·71	16·59	19·59	20·12	26·41

This Table shows a reduction in the mean daily sick in all the Commands, but especially in Bermuda where the proportion in 1860 was raised much above the average by the great prevalence of fever. Compared even with troops serving at home, the results in Nova Scotia and Canada are very satisfactory.

Section IV.

Influence of Age on Mortality.

The following Table, compiled from Abstract No. XIV. of Appendix, shows the proportion of mortality to the strength in each of the Commands according to age, arranged in quinquennial periods:—

Stations.	Ratio of Deaths per 1,000 of Strength at each age.					
	Under 20.	20–24.	25–29.	30–34.	35–39.	40 and upwards.
Bermuda	..	9·43	26·75	6·76	30·30	
Nova Scotia, &c.	14·70	6·44	6·67	4·44	43·48	
Canada	..	7·86	9·19	18·66	20·96	10·20
Newfoundland	..	..	..	..	20·	34·39
Total	5·18	7·42	11·65	8·95	24·69	10·87

These ratios show a progressive increase in the mortality up to the age of 30, more rapid than in civil life in the United Kingdom; the reduction at the period 30–34 is probably an irregularity arising from the small numbers under observation.

IV.—ON THE HEALTH OF THE TROOPS SERVING IN THE WEST INDIES.

Section I.

Sickness and Mortality.

Windward and Leeward Command.

I. Windward and Leeward Command.

1. White Troops.

The Force employed in this Command has remained the same as in 1860, consisting of Royal Artillery, the service companies of the 1st Battalion 21st, and two companies of the 14th Regiment detached from Jamaica.

The average strength of the white troops during the year was 1,259, the admissions into hospital were 1,374, and the deaths 7, of which 3 occurred in and 3 out of hospital, and 1 among the invalids sent to England. These numbers give the ratio of 1,091 admissions into hospital and 5·55 deaths per 1,000 of the mean strength, the former being exactly the same as the average of the two preceding years, and the latter under half that average, but identical with the ratio in 1860.

The following Table shows the influence of the different classes of diseases in producing these rates of sickness and mortality. A detailed return of the diseases in 1861 will be found in Abstract No. XV. of Appendix.

Orders.	Diseases.	1861. Strength, 1,259. Admitted.	Died. In the Command.	Died. Of Invalids.	Died. Total.	1861. Ratio per 1,000. Admitted.	1861. Ratio per 1,000. Died.	1859–60. Ratio per 1,000. Admitted.	1859–60. Ratio per 1,000. Died.
	Class I.								
1	Miasmatic Diseases. ..	684	..	..	..	543·3	..	496·5	5·69
2	Enthetic „	91	..	..	..	72·3	..	122·7	..
3	Dietic „	50	..	..	..	39·7	..	11·7	·40
4	Parasitic „	3	..	..	..	2·4	..	2·8	..
	Class II.								
1	Diathetic Diseases . ..	6	..	..	..	4·8	..	4·9	..
2	Tubercular „	18	2	..	2	14·3	1·59	11·7	1·21
	Class III. Diseases of the—								
1	Nervous system	39	1	..	1	31·0	·79	36·0	2·45
2	Circulatory „	5	..	..	..	3·9	..	1·2	·80
3	Respiratory „	38	..	1	1	30·2	·79	34·8	·40
4	Digestive „	95	2	..	2	75·4	1·59	83·8	·40
5	Urinary „	..	..	..	..	..	..	·8	..
6	Reproductive „	26	..	..	..	20·6	..	1·2	..
7	Locomotive „	7	..	..	..	5·5	..	3·6	..
8	Integumentary „	183	..	..	..	145·3	..	172·5	..
	Class IV.								
4	Diseases of Nutrition ..	1	..	..	..	·8	..	2·8	..
	Class V.								
1	Accidents	125	1	..	1	99·3	·79	94·7	·40
4	Suicide	..	..	..	..	..	..	·4	·80
6	Corporal Punishment ..	3	..	..	..	2·4	..	1·2	..
	Diseases not stated . ..	..	..	..	..	..	..	8·9	..
	Total	1,374	6	1	7	1091·2	5·55	1092·2	12·55

Windward and Leeward Command.

On examining this Table it will be observed, that while the total admissions in 1861 correspond exactly with the average of the two preceding years, there is a considerable difference in the various classes. Thus, there has been an increase in miasmatic and dietic diseases which has been compensated by a reduction in the amount of venereal and diseases of the integumentary system. The difference in the mortality has been chiefly in miasmatic diseases.

Miasmatic Diseases.—On subdividing these, as usual, into smaller groups the following results are obtained:—

Diseases.	1861.		Annual Ratio per 1,000 of Strength			
			1861.		1859–60.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	4	..	3·2	..	2·4	..
Paroxysmal „	381	..	302·6	..	224·3	5·26
Continued „	3	..	2·4	..	73·3	·40
Dysentery, Diarrhœa, and Cholera ..	80	..	63·5	..	36·0	..
Sore-throat and Influenza	14	..	11·1	..	8·9	..
Ophthalmia	159	..	126·3	..	105·7	..
Rheumatism	23	..	18·3	..	32·4	..

Although small-pox prevailed as an epidemic at Trinidad during the first six months of the year, no cases of it occurred among the soldiers. During the second half of the year measles became epidemic at Barbadoes and Trinidad among the civil population, but there were only two admissions in each of these islands among the white troops.

There has been during the year a marked increase in the amount of paroxysmal fevers and a decrease in continued fevers. The increase was entirely confined to St. Lucia and British Guiana. At the former it may have been perhaps merely an irregularity attributable to the small amount of the force employed; at the latter, it arose from special circumstances which deserve notice.

On the 26th of May, yellow fever broke out among the civil population at George Town, but chiefly confined to the shipping and the lower orders of Portuguese. As a precautionary measure, on the 3rd of June the detachment of the 21st Regiment was moved by rail from George Town to Belfield, distant about seventeen miles, and was there put under canvas. During the first sixteen days after its arrival there seven cases of yellow fever occurred, all of which recovered, and the disease then ceased among the troops. The disease continued, however, to prevail in George Town and its vicinity till towards the end of December, and, in consequence, the authorities did not consider it advisable that the troops should return from Belfield till the 18th of January, 1862. At Belfield the tents were pitched on a sandy ridge, about 1,000 yards from the sea. The surrounding country is low, flat, and marshy, being at high water several feet below the level of the sea, from the irruption of which it is protected by dykes and sluices. As might have been anticipated, among troops encamped in such a situation, intermittent fevers prevailed to a great extent, but of a mild type, none of the cases having terminated fatally. The locality selected was the most eligible that could be found within reach of George Town; and the result, so far as regards the immunity from yellow fever, was satisfactory; but it may be a question whether, under similar circumstances, it would not be advisable to remove the European troops entirely from the colony, unless there were military or political reasons to prevent such a measure.

Between the 26th of May and 31st of December, there were 767 cases of yellow fever treated in the Seamen's Hospital at George Town, of which 92 died; 56 cases in the Colonial Hospital, of which 15 died; and it was stated that about 120 cases, with 18 deaths, occurred in private practice. We have no information, as to the numbers living of each of the classes among whom these cases occurred, but the intensity of the disease is shown by the high rate

Windward and Leeward Command.

of mortality, which was about 1 death in 8 cases among the seamen, 1 in 4 in the Colonial Hospital, and 1 in 6 in private practice.

In the end of August a few cases of yellow fever, but of a mild type, occurred among the civil population of New Amsterdam, Berbice, and the sailors on the Berbice River; but the disease did not prevail as an epidemic, and only 4 deaths by it were recorded.

Diarrhœa was much more prevalent than usual during the year, at all the stations except British Guiana.

Ophthalmia also gave rise to an increased number of admissions.

Dietic Diseases have been greatly above the average of the two preceding years, the excess being entirely in cases of intemperance (*ebriositas*) at Barbadoes. It is probable that the reduction already noticed in the amount of continued fever may be due to cases arising from intemperance, which were formerly returned as continued fever, now appearing under their proper head.

The admissions by *Delirium Tremens* were 13, being exactly the same as in the preceding year.

The other classes of diseases do not seem to require comment.

The admissions and deaths at each of the subordinate stations in the Command will be found detailed in Abstract No. XV. of Appendix, from which the following summary has been prepared.

Orders.	Diseases.	Ratio per 1,000 of Mean Strength in 1861.							
		Barbadoes.		St. Lucia.		Trinidad.		British Guiana.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic diseases ..	320·2	..	436·2	..	751·2	..	1444·5	..
2	Enthetic „ ..	100·4	..	10·6	..	44·4	..	13·1	..
3	Dietic „ ..	49·5	..	63·8	..	4·4	..	26·2	..
4	Parasitic „ ..	3·8	..	..	..	..	..	.. ..	..
	Class II.								
1	Diathetic diseases ..	6·3	..	..	..	4·4	..	..	..
2	Tubercular „ ..	20·3	1·27	..	..	..	4·44	13·1	..
	Class III. Diseases of the—								
1	Nervous system ..	20·3	1·27	63·8	..	35·6	..	52·4	..
2	Circulatory „ ..	3 8	..	..	..	8·8	..	..	..
3	Respiratory „ ..	39·4	..	..	..	4·4	..	32·7	..
4	Digestive „ ..	83·9	..	85·1	10·6	84·4	4·44	26·2	..
5	Urinary „ ..	..	..	..	..	..	..	..	..
6	Reproductive „ ..	25·4	..	..	..	22·2	..	6·6	..
7	Locomotive „ ..	6·3	..	..	..	8·8	..	..	..
8	Integumentary „ ..	179·2	..	138·3	..	53·3	..	111·1	..
	Class IV.								
4	Diseases of Nutrition..	1·3	..	..	..	..	..	..	..
	Class V.								
1	Accidents	110·6	..	180·8	..	57·9	..	52·4	6·6
6	Corporal Punishment..	3 8	..	..	..	..	..	..	..
	Total ..	974·5	2·54	978·6	10·6	1079·8	8·88	1778·3	6·6
	Ratio per 1,000 in 1859-60 ..	1034·6	6·40	857·1	5·10	1101·5	41·36	1122·9	9·97

This Table shows the sickness to have been below the average in Barbadoes and Trinidad, and above it in St. Lucia and British Guiana, in the latter to a

very great extent. The excess in both was confined to the class of miasmatic diseases, and in Demerara was caused entirely by the prevalence of intermittent fever, attributable, as already stated, to the marshy locality in which it was necessary to encamp the troops for upwards of seven months. The mortality in all the stations was extremely low—lower, indeed, in Barbadoes and British Guiana than among the Infantry serving in the United Kingdom. *Windward and Leeward Command.*

II. Black Troops.

The black troops employed in this Command consisted, as formerly, of the head-quarters of one of the West India Regiments and a corps of Military Labourers. In the beginning of June, the head-quarters of the 1st West India Regiment arrived from Nassau N.P., to replace the 3rd West India Regiment sent to Jamaica.

The average strength of the black troops throughout the year was 1,007; the admissions into hospital among them were 852 and the deaths 21, all in hospital; being in the annual ratio of 846, and 20·85 per 1,000 of the mean strength. These results show a very considerable reduction in the sickness, compared with the average of the two preceding years, but merely a trifling difference in the mortality.

The diseases which occurred during the year will be found detailed in Abstract No. XVI. of Appendix, from which and previous Reports the following Table has been compiled :—

Orders.	Diseases.	1861. Strength 1,007. Admitted.	1861. Strength 1,007. Died.	1861. Ratio per 1,000. Admitted.	1861. Ratio per 1,000. Died.	1859-60. Ratio per 1,000. Admitted.	1859-60. Ratio per 1,000. Died.
	Class I.						
1	Miasmatic diseases	319	5	316·8	4·96	290·4	5·78
2	Enthetic „	160	..	158·9	..	231·9	..
3	Dietic „	2	..	2·0	..	..	..
4	Parasitic „	1	..	1·0	..	1·2	..
	Class II.						
1	Diathetic diseases	1	1	1·0	·99	8·3	·41
2	Tubercular „	30	9	29·8	8·94	12·0	4·96
	Class III. Diseases of the—						
1	Nervous system	24	1	23·8	·99	16·5	2·48
2	Circulatory „	4	..	3·9	..	2·9	1·66
3	Respiratory „	69	2	68·5	1·99	101·9	2·06
4	Digestive „	30	..	29·8	..	38·4	1·23
5	Urinary „	4	2	3·9	1·99	1·2	·41
6	Reproductive „	15	..	14·9	..	1·2	..
7	Locomotive „	2	..	2·0	..	2·1	..
8	Integumentary „	105	..	104·3	..	172·1	·41
	Class IV.						
4	Diseases of Nutrition	1	..	1·0	..	1·2	..
	Class V.						
1	Accidents	80	1	79·5	·99	79·6	·41
3	Homicide	..	..	..	..	0·8	·82
4	Suicide	..	..	..	..	..	1·23
5	Corporal punishment	5	..	4·9	..	7·4	..
	Diseases not specified	..	..	..	..	26·8	..
	Total	852	21	846·0	20·85	995·9	21·86

Windward and Leeward Command.

It will be seen from this Table that the decrease in the sickness has been chiefly in venereal and in diseases of the respiratory and integumentary systems. There has been an increase in miasmatic diseases, and both the admissions and deaths by tubercular diseases have been doubled.

Miasmatic Diseases.—On subdividing this class in the usual manner, the following results are obtained.

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Mean Strength.			
			1861.		1859-60.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	55	..	54·6	..	26·6	·82
Paroxysmal „	66	2	65·5	·20	101·1	2·07
Continued „	4	..	4·0	..	20·6	1·65
Dysentery, Diarrhœa, and Cholera ..	30	3	29·8	·30	13·2	·82
Sorethroat and Influenza	30	..	29·8	..	13·2	..
Ophthalmia	20	..	19·9	..	26·0	..
Rheumatism	104	..	103·3	..	87·1	·41

Eruptive Fevers have amounted to double the average of the two preceding years, but have in no instance proved fatal. We have already stated that small-pox prevailed in an epidemic form at Trinidad, and measles, both there and at Barbadoes, among the civil population. Of the former 8, and of the latter disease 46 cases occurred among the black troops.

Paroxysmal and *Continued Fevers* and *Ophthalmia* were less prevalent than before, while there was an increase in the admissions by the other subordinate groups of this class.

Tubercular Diseases have given rise to rather more than twice the average of the admissions during the two preceding years, and to nearly twice the average of the deaths ; but the ratio corresponds closely with that of 1860, so that, whatever may have been the cause of the increase in that year, it appears to have continued in operation in 1861.

Violent Deaths.—The only one returned in this class was that of a private of the 3rd West India Regiment, who committed suicide with his rifle.

Corporal Punishment.—The proportion of admissions into hospital in consequence of the infliction of this punishment was exactly half the average of the two preceding years.

The following Table, prepared from No. XVI. of Appendix, shows the relative influence of the various classes of diseases among the black troops at the different stations.

Windward and Leeward Command.

Orders.	Diseases.	Annual Ratio per 1,000 of Strength in 1861.							
		Barbadoes.		St. Lucia.		Trinidad.		British Guiana.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic diseases	335·8	3·69	306·1	10·2	536·1	10·31	196·3	3·70
2	Enthetic „	219·6	..	91·8	..	72·2	..	100·0	..
3	Dietic „	3·7	..	..	..	..	..	..	..
4	Parasitic „	1·9	..	..	..	..	..	..	..
	Class II.								
1	Diathetic diseases	1·9	1·84	..	..	..	..	..	..
2	Tubercular „	27·7	9·22	10·2	10·2	41·2	10·31	33·3	7·40
	Class III. Diseases of the—								
1	Nervous system	27·7	..	40·8	..	20·7	..	11·1	3·70
2	Circulatory „	5·5	..	..	..	..	..	3·7	..
3	Respiratory „	73·8	1·84	71·4	..	30·9	..	74·1	3·70
4	Digestive „	40·6	..	40·8	..	30·9	..	3·7	..
5	Urinary „	1·9	..	..	..	..	..	14·8	7·40
6	Reproductive „	12·9	..	10·2	..	30·9	..	11·1	..
7	Locomotive „	..	..	..	..	..	..	3·7	..
8	Integumentary „	105·2	..	112·3	..	154·6	..	85·2	..
	Class IV.								
4	Diseases of Nutrition	..	..	10·2	..	..	..	..	..
	Class V.								
1	Accidents	79·3	..	112·3	..	92·8	..	59·2	..
4	Suicide	..	..	..	..	..	..	3·7	3·70
6	Corporal Punishment ..	5·5	..	10·2	..	10·3	..	..	..
	Total	943·0	16·59	816·3	20·4	1020·6	20·62	599·9	29·60
	Average of 1859-60	1080·9	21·86	705·9	13·57	817·3	31·96	983·7	21·24

The admissions into hospital in British Guiana have been greatly below the previous average, and there has also been a considerable reduction in Barbadoes; while in St. Lucia and Trinidad there has been an increase. Miasmatic diseases have been more prevalent than formerly at all the stations, except British Guiana where they have amounted to only one-half of the average of the two preceding years.

At all the stations except St. Lucia, where the previous average was remarkably low, there has been a very marked decrease in the admissions by venereal.

II. Jamaica.

Jamaica.

1. White Troops.

During 1861 no change took place in the force of white troops serving in this island, which consisted of a battery of the 7th Brigade Royal Artillery, the head-quarters with 6 companies of the 1st Battalion 14th Regiment, and a few non-commissioned officers of the West India Regiment. The average strength during the year was 636, out of which there were 521 admissions into

Jamaica. hospital and 6 deaths, being in the ratio of 819 and 9·43 per thousand of the strength. No deaths occurred among the invalids sent to England. The ratio of admissions is almost identical with that of 1860, but that of the deaths is rather under half the proportion for that year.

The following Table shows the influence of the various classes of diseases in causing this sickness and mortality. The diseases will be found specified in Abstract No. XV. of Appendix:—

Order.	Diseases.	1861. Strength, 636. Admitted.	1861. Strength, 636. Died.	1861. Ratio per 1,000. Admitted.	1861. Ratio per 1,000. Died.	1859-60. Ratio per 1,000: Admitted.	1859-60. Ratio per 1,000: Died.
	Class I.						
1	Miasmatic diseases	227	3	356 9	4·72	372·7	8·21
2	Enthetic „	52	..	81·8	..	146·1	..
3	Dietic „	25	..	39·3	..	27·1	..
4	Parasitic „	3	..	4·7	..	2·5	..
	Class II.						
1	Diathetic diseases	1	..	1·6	..	2·5	..
2	Tubercular „	3	..	4·7	..	3·3	2·46
	Class III. Diseases of the—						
1	Nervous system	14	..	22·0	..	14·8	2·46
2	Circulatory „	6	1	9·4	1·57	5·7	..
3	Respiratory „	27	..	42·4	..	46·0	..
4	Digestive „	19	1	29·9	1·57	162·5	1·64
5	Urinary „	3	..	4·7	..	..	..
6	Reproductive „	..	..	..	..	2·5	..
7	Locomotive „	1	..	1·6	..	·8	..
8	Integumentary „	58	..	91·2	..	167·5	..
	Class IV.						
4	Diseases of Nutrition	3	..	4·7	..	2·5	..
	Class V.						
1	Accidents	79	..	124·2	..	115·8	..
3	Homicide	..	..	..	..	..	·82
4	Suicide	..	1	..	1·57	·8	1·64
6	Corporal punishment	..	..	..	..	5·7	..
	Diseases not specified	..	..	..	..	3·3	..
	Total	521	6	819·1	9·43	1082·1	17·23

This shows a very considerable reduction, both in the admissions and deaths, compared with the average of the two preceding years. It has been most marked in the admissions by diseases of the digestive and integumentary systems, in venereal, and, though to a less extent, in miasmatic diseases; and in the deaths by miasmatic and tubercular diseases, and those of the nervous system.

Miasmatic Diseases, when subdivided, give the following results:—

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1861.		1859-60.	
			Admitted.	Died.	Admitted.	Died.
Paroxysmal Fevers	45	1	70·7	1·57	82·9	5·75
Continued ,, ...	66	1	103·8	1·57	66·5	2·46
Dysentery, Diarrhœa, &c. ..	38	1	59·7	1·57	36·9	..
Sorethroat and Influenza ..	6	..	9·4	..	8·2	..
Ophthalmia	57	..	89·6	..	156·0	..
Rheumatism	8	..	12·6	..	18·9	..

There has been an increase in the prevalence of continued fevers and of diarrhœa in 1861, but a very marked diminution in ophthalmia. Although the ratio of admissions by paroxysmal fevers is below the average of the two preceding years, it is more than double that of 1860. This has arisen from the return of the Royal Artillery to Port Royal from Newcastle, where they had been stationed during the latter half of that year in consequence of the prevalence of yellow fever at Port Royal.

Of the cases of paroxysmal fevers, 25 occurred at Port Royal, 17 at Newcastle, and 3 at Up-Park Camp. Calculated on the average strength at the first two of these stations, the ratio of admissions amounts to 312 and 32 per 1000 respectively.

One death by yellow fever occurred among the white troops during the year. It was that of a sergeant of the 1st Battalion 14th Regiment, who was detached to assist in drilling the Volunteers, and died at Savannah-la-Mar.

The reduction in the amount of ophthalmia has been due, as explained in last Report, to the change of regiments—the 41st, which then returned home, having suffered from it to a great extent.

Dietic Diseases.—The 25 admissions in this class were all from intemperance (*ebriositas*). Nine of them, or in the ratio of 112 per 1,000 of the strength at that station, occurred at Port Royal; and 15 at Newcastle, or 28 per thousand of the force there. The remaining admission was at Up-Park Camp. One of the men, while under treatment at Port Royal, committed suicide by cutting his throat; but his death is, of course, reported under Class V., Order 4.

The prevalence of the other classes of diseases does not differ materially from the results of 1860, and they do not seem therefore to require special comment.

II. Black Troops.

In the beginning of 1861, the black troops in Jamaica consisted of a company of Artillery and the head-quarters of the 2nd West India Regiment. In the beginning of May, the latter were relieved by the head-quarters of the 3rd West India Regiment from Barbadoes. The average strength of these troops was 536, the admissions into hospital amounted to 678, and the deaths to 10, of which 2 occurred out of hospital. These numbers give the proportion of 1,265 admissions and 18·65 deaths per 1000 of mean strength; the former being greatly in excess of, but the latter much below, the ratios in 1860, which were 818 and 31·42 respectively.

The following Table, compiled from Abstract No. XVI. of Appendix, and from previous Reports, shows the influence of the different classes of diseases in causing this sickness and mortality:—

Jamaica.

Order.	Diseases.	1861. Strength, 536. Admitted.	1861. Strength, 536. Died at Jamaica.	1861. Ratio per 1,000. Admitted.	1861. Ratio per 1,000. Died.	1859-60 Ratio per 1,000. Admitted.	1859-60 Ratio per 1,000. Died.
	Class I.						
1	Miasmatic diseases	238	2	444·0	3·73	479·5	9·75
2	Enthetic „	151	..	281·7	..	277·5	1·30
3	Dietic „	2	..	3·7	..	2·6	..
4	Parasitic „	2	..	3·7	..	·6	..
	Class II.						
1	Diathetic diseases	5	..	9·3	..	3·9	1·30
2	Tubercular „	8	3	14·9	5·60	16·2	5·85
	Class III. Diseases of the—						
1	Nervous system.. ..	7	..	13·1	..	29·2	2·60
2	Circulatory „	1	..	1·9	..	1·3	..
3	Respiratory „	66	1	123·1	1·86	50·0	6·50
4	Digestive „	37	3	69·0	5·60	32·4	1·30
5	Urinary „	7	..	13·1	..	2·0	..
6	Reproductive „	9	..	16·8	..	3·9	..
7	Locomotive „	..	..	..	..	2·6	..
8	Integumentary „	94	..	175·4	..	98·8	·65
	Class IV.						
4	Diseases of Nutrition ..	..	..	..	..	..	..
	Class V.						
1	Accidents	50	1	93·3	1·86	42·9	..
3	Homicide	..	..	..	..	·6	·65
4	Suicide	..	..	..	..	..	·65
5	Execution	..	..	..	..	..	·65
6	Corporal punishment ..	1	..	1·9	..	9·7	..
	Diseases not specified ..	..	..	..	..	7·1	..
	Total	678	10	1264·9	18·65	1060·8	31·20

The great increase in the admissions has taken place chiefly in the diseases of the respiratory, digestive, and integumentary systems, and in accidents; and the reduction in the deaths, in miasmatic diseases and those of the nervous and respiratory systems.

Miasmatic Diseases.—The subordinate groups of this class give the following results:—

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Mean Strength. 1861. Admitted.	1861. Died.	1859-60. Admitted.	1859-60. Died.
Eruptive Fevers	1	..	1·9	..	..	..
Paroxysmal „	132	1	246·3	1·86	343·7	4·55
Continued „	28	..	52·2	..	18·2	3·25
Dysentery, Diarrhœa, and Cholera ..	16	1	29·8	1·86	24·7	1·29
Sorethroat and Influenza	9	..	16·8	..	13·0	..
Opthalmia..	11	..	20·5	..	22·1	..
Rheumatism	32	..	59·7	..	57·2	·65

This Table shows a considerable reduction in paroxysmal, but an increase in continued fevers. All the other groups have been more prevalent than formerly, except ophthalmia, which has been slightly below the average. *Jamaica.*

Diseases of the respiratory, digestive, and integumentary systems, were much more prevalent than in the two preceding years; but the medical officers assign no probable cause for this increase.

Corporal punishment was inflicted in only one instance, being in a much lower proportion to the strength than during the previous period.

III. Bahamas. *Bahamas.*

The force employed in the Bahamas has consisted, as formerly, of a few men of the Royal Artillery, and the head-quarters of one of the West India Regiments. In the end of May, the 1st West India Regiment was relieved by the 2nd from Jamaica.

There were no deaths in the detachment of the Royal Artillery, consisting of ten men, nor among the European non-commissioned officers of the West India Regiment.

The average strength of the black troops during the year was 381 men, among whom there were 340 admissions into hospital and 10 deaths, being in the proportion of 892 and 26·23 per 1,000 of strength; the former was considerably above, and the latter under, the average of the two preceding years.

The following Table shows the influence of the different classes of diseases in producing sickness and mortality among the troops. The diseases occurring in 1861 will be found stated in detail in Abstract No. XVI. of Appendix.

Order.	Black Troops. Diseases.	1861. Strength, 381. Admitted.	1861. Strength, 381. Died.	1861. Annual Ratio per 1,000. Admitted.	1861. Annual Ratio per 1,000. Died.	1859-60. Annual Ratio per 1,000. Admitted.	1859-60. Annual Ratio per 1,000. Died.
	Class I.						
1	Miasmatic diseases ..	168	3	440·9	7·87	317·4	4·81
2	Enthetic „ ..	63	..	165·4	..	144·2	..
3	Dietic „ ..	1	..	2·6	..	4·8	..
4	Parasitic „ ..	..	..	..	..	11·2	..
	Class II.						
1	Diathetic diseases ..	2	..	5·2	..	3·2	1·60
2	Tubercular „ ..	8	4	21·0	10·49	14·4	11·22
	Class III. Diseases of the—						
1	Nervous system ..	4	..	10·5	..	20·8	4·81
2	Circulatory „ ..	1	..	2·6	..	1·6	..
3	Respiratory „ ..	29	2	76·1	5·25	43·3	4·81
4	Digestive „ ..	3	1	7·9	2·62	22·4	1·60
5	Urinary „ ..	..	..	..	..	1·6	..
6	Reproductive „ ..	13	..	34·1	..	..	..
7	Locomotive „ ..	1	..	2·6	..	4·8	..
8	Integumentary „ ..	30	..	78·7	..	64·2	..
	Class IV.						
4	Diseases of Nutrition ..	..	..	..	..	4·8	..
	Class V.						
1	Accidents	17	..	44·6	..	76·9	..
4	Suicide „	..	..	..	..	1·6	1·60
6	Corporal punishment ..	..	..	..	..	3·2	..
	Diseases not specified ..	..	..	..	..	12·8	..
	Total	340	10	892·2	26·23	753·2	30·45

Bahamas. The most striking point in this Table is the increase of admissions by miasmatic diseases. This has been almost entirely due to the prevalence of an epidemic of measles, which broke out immediately after the arrival of the 2nd West India Regiment, and was the cause of 44 admissions and 1 death among the troops.

Venereal has been more prevalent than formerly, which is attributed by the Medical Officer to the frequent presence of men-of-war in the port, "a sensible increase being noticed shortly after their arrival."

Honduras.

IV. Honduras.

The white troops serving at Honduras consisted of a few European non-commissioned officers, the average strength during the year being about 9. Of these a company sergeant-major of the 3rd West India Regiment died of bilious cholera.

The black troops consisted of detachments of the 2nd and 3rd West India Regiments and a few black gunners from Jamaica. Their average strength was 434, the admissions into hospital were 661, and the deaths 7; being in the ratio of 1,523 and 16·12 per 1,000 of mean strength.

The following Table shows the influence of the different classes of diseases in producing sickness and mortality. The diseases will be found detailed in Abstract No. XVI. of Appendix.

Order.	Black Troops. Diseases.	1861. Strength, 434. Admitted.	1861. Strength, 434. Died.	1861. Annual Ratio per 1,000. Admitted.	1861. Annual Ratio per 1,000. Died.	1859-60. Annual Ratio per 1,000. Admitted.	1859-60. Annual Ratio per 1,000. Died.
	Class I.						
1	Miasmatic diseases ..	383	1	882·6	2·30	368·7	6·35
2	Enthetic „ ..	39	..	89·9	..	104·5	..
3	Dietic „ ..	..	..	..	..	4·7	4·74
4	Parasitic „ ..	9	..	20·7	..	11·1	..
	Class II.						
1	Diathetic diseases ..	7	..	16·1	..	..	..
2	Tubercular „ ..	4	2	9·2	4·61	4·7	..
	Class III. Diseases of the—						
1	Nervous system ..	10	1	23·0	2·30	7·9	1·58
2	Circulatory „ ..	4	3	9·2	6·91	1·6	1·58
3	Respiratory „ ..	36	..	82·9	..	52·2	1·58
4	Digestive „ ..	16	..	36·9	..	44·3	..
5	Urinary „ ..	1	..	2·3	..	4·7	..
6	Reproductive „ ..	7	..	16·1	..	4·7	..
7	Locomotive „ ..	4	..	9·2	..	1·6	..
8	Integumentary „ ..	97	..	223·5	..	150·4	1·58
	Class IV.						
4	Diseases of Nutrition ..	..	..	..	..	..	..
	Class V.						
1	Accidents..	41	..	94·5	..	101·3	1·58
6	Corporal punishment ..	3	..	6·9	..	14·2	..
	Diseases not specified ..	..	..	..	..	4·7	1·58
	Total	661	7	1523·0	16·12	881·3	20·57

Honduras.

The admissions into hospital in 1861 were greatly in excess of the average of the two preceding years, but the deaths were one-fifth below it. The excess was chiefly in the class of miasmatic diseases, and caused by the much greater prevalence of intermittent fever. This was attributed by the Senior Medical Officer partly to the enormous rainfall during the year, there having been only two weeks between the 8th of February and 31st December in which none fell, and the total amount registered having been 98 inches. Another circumstance, which probably increased the prevalence of fever, was that in consequence of a predatory incursion of Indians, a force of 125 men was sent up to Albion Island, on the Rio Hondo, in the middle of March, and remained encamped there till May, when they were withdrawn. The force at Corosal was considerably increased, and was crowded in the barracks and in tents till the end of July. The troops remained healthy while at Albion Island, but suffered very much from fever at Corosal.

There was a considerable increase, also, in the admissions by diseases of the integumentary system, owing to the prevalence of ulcers.

The deaths among the soldiers were seven in number, three of which were caused by disease of the heart, and two by consumption. Two officers died during the year—both of yellow fever—a Deputy-Assistant Commissary-General at Ruatan, and an Ensign of the 3rd West India Regiment, at Belize.

Section II.

On the extent of Invaliding.

West Indies.

During the year there were sent home from the Windward and Leeward Command 22 men recommended for discharge as invalids, and 32 for change of climate; and from Jamaica, 1 for discharge, and 6 for change. The diseases which caused this are stated in Abstract No. XVII. of Appendix, of which the following is a classified summary.

White Troops	Windward and Leeward Command. Mean Strength, 1,259.				Jamaica. Mean Strength, 636.			
	Recommended for—		Ratio per 1,000, for—		Recommended for—		Ratio per 1,000, for—	
	Discharge.	Change of Climate.	Discharge.	Change of Climate.	Discharge.	Change of Climate.	Discharge.	Change of Climate.
Miasmatic Diseases ..	1	23	·79	18·27	1	5	1·57	7·86
Enthetic „	1	..	·79	..	..	..	..	..
Diathetic „	1	..	·79	..	..	..	..	..
Tubercular „	7	3	5·56	2·38	..	..	..	..
Diseases of the—								
Nervous System ..	4	..	3·18	..	..	..	..	..
Circulatory „ ..	4	..	3·18	..	..	..	..	..
Respiratory „ ..	..	1	..	·79	..	1	..	1·57
Reproductive „ ..	..	1	..	·79	..	..	..	..
Locomotive „ ..	2	1	1·59	·79	..	..	..	..
Integumentary „ ..	..	1	..	·79	..	..	..	..
Accidents and Violence..	2	2	1·59	1·59	..	..	..	..
Total	22	32	17·47	25·40	1	6	1·57	9·43

Of those sent home for change of climate, nearly three-fourths were on account of miasmatic diseases, chiefly ophthalmia. Consumption, mental alienation, and hypertrophy of the heart were the chief causes of men being sent home for discharge from the service.

The number finally discharged as invalids during the year was 23 from the Windward and Leeward Command, and 8 from Jamaica, for the following disabilities:—

West Indies.

White Troops	Windward and Leeward Command.		Jamaica.	
Diseases.	Discharged as Invalids.	Ratio per 1,000 of Strength.	Discharged as Invalids.	Ratio per 1,000 of Strength.
Dysentery and Hepatic Disease ..	1	·79	..	..
Eye Diseases	7	5·56	1	1·57
Rheumatism and Chronic Pains ..	..	..	1	1·57
Pulmonary Disease	7	5·56	4	6·29
Mental ,, ...	2	1·59	..	..
Cardiac ,, ...	2	1·59	..	..
Hernia	..	..	1	1·57
Ulcers and Varix	2	1·59	..	..
Dislocations	2	1·59	..	..
Total	23	18·27	7	11·
Average of 1859–60 ..	..	3·64	..	4·10

The numbers discharged as invalids are considerably above the average of the two preceding years, but there were special circumstances, noticed in previous Reports, which reduced the proportion below the ordinary amount. The two principal causes of discharge have been ophthalmia and consumption.

In the Windward and Leeward Command 22, and in Jamaica 24, of the Black Troops were discharged as invalids, being in the ratio of 21·85 and 44·77 per 1,000 of mean strength. The causes of discharge were as follows:—

Black Troops	Windward and Leeward Command.		Jamaica.	
Disabilities of Invalids.	Discharged as Invalids.	Ratio per 1,000 of Strength.	Discharged as Invalids.	Ratio per 1,000 of Strength.
Rheumatism	10 } 10	9·92	3 } 5	9·33
Ophthalmia	.. }		2 }	
Tumour	..	..	2 2	3·73
Scrofula	2 } 3	2·98	.. } 3	5·60
Consumption	1 }		3 }	
Mania	1 } 2	1·99	.. } 3	5·60
Epilepsy	1 }		3 }	
Bronchitis	2 } 3	2·98	1 } 1	1·86
Asthma	1 }		.. }	
Hæmorrhoids	..	..	1 1	1·86
Deafness	..	..	1 1	1·86
Abscess	1 } 2	1·99	.. } 4	7·46
Ulcer	1 }		4 }	
Contusion	.. }		1 }	
Sprain	1 } 2	1·99	1 } 4	7·46
Gunshot Wound	1 }		2 }	
Total	22	21·85	24	44·76
Discharged in 1860 ..	..	39·5	..	17·7

The proportion discharged as invalids has been much higher in the Windward and Leeward Command, and much lower in Jamaica, than in 1860. The marked difference in the proportion invalided in the two Commands on account of rheumatism, which was the prominent feature in the Returns of 1860, has disappeared.

Section III.

Mean Daily Sick.

West Indies.

The average number constantly sick in Hospital, of the White Troops, during 1861, was 43 in the Windward and Leeward Command, and 19 in Jamaica; and of the Black Troops, 32 in the Windward and Leeward Command, 30 in Jamaica, 18 in the Bahamas, and 19 in Honduras. These numbers furnish the following results:—

		White Troops.		Black Troops.			
		Windward and Leeward Command.	Jamaica.	Windward and Leeward Command.	Jamaica.	Bahamas.	Honduras.
Ratio per 1,000 constantly Sick.	1861 ..	34·15	29·87	31·78	52·23	47·24	43·78
	1859–60 ..	43·73	41·05	42·90	60·43	..	..
		days.	days.	days.	days.	days.	days.
Mean Sick Time to each Soldier.	1861 ..	12·47	10·90	11·60	20·43	17·24	15·98
	1859–60 ..	15·96	14·98	15·66	22·06	..	..
Average Duration of the Cases.	1861 ..	11·43	13·31	13·71	16·15	19·33	10·49
	1859–60 ..	14·61	13·85	15·78	20·79	..	..

This Table shows a marked reduction in the average non-effective from sickness, both of White and Black Troops. The much higher ratio among the Black than the White Troops in Jamaica may be traced to the circumstance of their being quartered in the lowlands, where intermittent fevers are rife, while the White Troops are in the more healthy climate of Newcastle.

Section IV.

Influence of Age on the Mortality.

In Abstract No. XVIII. of Appendix will be found a statement of the ages of the troops serving in the West Indies, and the deaths at each quinquennial period of life, from which the following ratios have been calculated regarding the White Troops.

White Troops	Under 20 Years.	20–24	25–29	30–34	35–39	40 and Upwards.
Ratio of Deaths per 1,000 of Strength.	..	2·92	6·27	10·58	..	..

Owing to defects in the returns it was impossible to give the usual information on this subject in the two preceding Reports. The above Table shows a marked increase with the advance of age, but the numbers under observation are too few to warrant any detailed comment.

The mortality at different periods of life among the Black Troops is shown in the following Table.

West Indies.

Black Troops.		Under 20 Years.	20–24	25–29	30–34	35–39	40 and Upwards.
Ratio of Deaths per 1,000 of Mean Strength.	1861 ..	9·85	20·71	16·70	15·38	27·45	..
	1859-60	16·89	27·48	24·56	41·93	14·16	25·97

The results for 1861, like those of the two preceding years, show a reduction in the rate of mortality in the quinquennial period, 25-29; but the great irregularity in the ratio, which was noticed in the Report for 1860, is becoming, and will probably continue to become, less marked, as increased numbers under observation are obtained by combining the returns of several years.

V.—ON THE HEALTH OF THE TROOPS SERVING IN WESTERN AFRICA.

Western Africa.

In the end of January the detachment of the 1st West India Regiment, which had been detained in the Command in consequence of the wreck of the troop-ship "Perseverance," embarked for the West Indies. The troops employed then consisted of a detachment of the 2nd West India Regiment, and of the Gold Coast Artillery Corps.

Among the white non-commissioned officers serving in the Command, averaging 5 or 6 in number, one death occurred, that of a serjeant-major of the Gold Coast Artillery by dysentery.

The average strength, admissions into hospital, and deaths of the black troops at Sierra Leone, the Gambia, and the Gold Coast respectively are shown in the following Table.

	Average Strength.	Admissions into Hospital.	Deaths	Ratio per 1,000 of strength.		1859–60.—Ratio per 1,000.	
				Admitted	Died.	Admitted	Died.
Sierra Leone ..	370	375	15	1013·6	40·53	579·6	24·48
The Gambia ..	481	470	20	1090·4	46·40	831·3	30·13
The Gold Coast ..	305	222	13	727·3	42·64	657·1	16·89

This Table shows the sickness and mortality in all three Commands to have been considerably above the average of the two preceding years. At Sierra Leone and the Gambia, this may have been to a considerable extent due to the circumstance that a portion of the force was twice employed on active service during the year. In the first quarter, they formed part of an expedition sent up the River Gambia against the Mandingoes, and in the end of November they again took the field against the King and Chiefs of Quiat, a tract of country recently ceded to the British Government.

Only three soldiers were killed by the enemy in these expeditions, but the fatigue and exposure of the men doubtless contributed much to the increase of sickness and mortality by disease.

The influence upon the troops of the different classes of diseases is shown in the following Table. The detailed statement of the diseases which occurred in 1861 will be found in Abstract No. XIX. of Appendix.

Orders.	Diseases.	Sierra Leone. Stations	Sierra Leone. Strength .. .. .. 370.						Gambia. 431.						Gold Coast. 305.					
		Admitted.	Died.	1861. Ratio per 1,000. Admitted.	1861. Ratio per 1,000. Died.	1859–60. Ratio per 1,000. Admitted.	1859–60. Ratio per 1,000. Died.		Admitted.	Died.	1861. Ratio per 1,000. Admitted.	1861. Ratio per 1,000. Died.	1859–60. Ratio per 1,000. Admitted.	1859–60. Ratio per 1,000. Died.	Admitted.	Died.	1861. Ratio per 1,000. Admitted.	1861. Ratio per 1,000. Died.	1859–60. Ratio per 1,000. Admitted.	1859–60. Ratio per 1,000. Died.
	Class I.																			
1	Miasmatic Diseases	114	4	308·1	10·81	210·8	4·08		272	3	631·1	6·96	316·3	3·01	31	3	101·6	9·84	136·8	3·38
2	Enthetic „ ..	90	..	243·2	..	96·6	..		55	..	127·6	..	167·2	3·01	12	..	39·3	..	45·6	..
3	Dietic „ ..	1	..	2·7	..	..	..		1	..	2·3	..	4·5	..	2	..	6·5	..	..	..
4	Parasitic „ ..	9	..	24·3	..	6·8	..		..	..	..	..	21·1	..	87	..	285·2	..	250·0	..
	Class II.																			
1	Diathetic Diseases ..	2	..	5·5	..	4·1	..		5	3	11·6	6·96	6·0	..	..	..	..	..	1·7	..
2	Tubercular „ ..	5	4	13·5	10·81	10·9	4·08		11	5	25·5	11·60	7·5	6·02	2	2	6·5	6·56	3·4	..
	Class III. Diseases of the—																			
1	Nervous System ..	8	2	21·6	5·40	13.6	4·08		6	1	13·9	2·32	12·0	1·51	7	3	22·9	9·84	6·7	1·69
2	Circulatory „ ..	2	..	5·5	..	..	..		..	..	..	..	4·5	3·01	..	..	..	..	..	..
3	Respiratory „ ..	31	2	83·8	5·40	59·9	2·72		45	7	104·4	16·24	91·9	6·02	11	1	36·1	3·28	25·3	1·69
4	Digestive „ ..	9	..	24·3	..	28·6	8·16		9	..	20·9	..	24·1	1·51	12	1	39·3	3·28	28·7	3·38
5	Urinary „ ..	..	..	..	..	2·7	..		1	1	2·3	2·32	1.5	..	1	..	3·2	..	5·1	..
6	Reproductive „ ..	1	..	2·7	..	..	..		..	..	..	..	3·0	..	2	..	6·5	..	1·7	..
7	Locomotive „ ..	9	..	24·3	..	8·2	1·36		3	..	6·9	..	10·6	1·51	8	..	26·2	..	5·1	..
8	Integumentary „ ..	56	..	151·3	..	80·3	..		28	..	65·0	..	94·9	..	29	..	95·1	..	86·1	..
	Class IV.																			
4	Diseases of Nutrition	..	..	..	..	1·3	..		..	..	..	..	3·0	..	..	..	..	..	..	..
	Class V.																			
1	Accidents	20	..	54·0	..	49·0	..		19	..	44·1	..	49·7	..	17	3	55·7	9·84	54·1	5·06
2	Battle	14	3	37.8	8·11	..	..		11	..	25·5	..	..	..	..	..	..	..	..	..
3	Homicide	..	..	..	..	..	..		..	..	..	..	1·5	1·51	..	..	..	..	..	..
4	Suicide	..	..	..	..	..	..		..	..	..	..	..	1·51	..	..	..	..	..	1·69
5	Execution	..	..	..	..	..	..		..	..	..	..	..	1·51	..	..	..	..	..	..
6	Corporal Punishment	4	..	11·0	..	2·7	..		4	..	9·3	..	3·0	..	1	..	3·2	..	1·7	..
	Diseases not specified	..	..	..	..	4·1	..		..	..	..	..	9·0	..	..	..	..	..	5·1	..
	Total	375	15	1013·6	40·53	579·6	24·48		470	20	1090·4	46·40	831·3	30·13	222	13	727·3	42·64	657·1	16·89

Western Africa.

MIASMATIC DISEASES have been more prevalent at Sierra Leone and the Gambia, but less so on the Gold Coast, than during the two preceding years. On subdividing the class the following results are obtained :—

Diseases.	Sierra Leone.			The Gambia.			The Gold Coast.		
	Admitted in 1861.	Ratio per 1,000 admitted.		Admitted in 1861.	Ratio per 1,000 admitted.		Admitted in 1861.	Ratio per 1,000 admitted.	
		1861.	1859-60.		1861.	1859-60.		1861.	1859-60.
Eruptive Fevers	4	10·8	38·1	21	48·7	54·2	..	..	11·8
Paroxysmal „	71	191·9	62·6	211	489·6	168·7	2	6·6	16·9
Continued „	..	..	5·4	1	2·3	15·1	..	..	3·4
Dysentery and Diarrhœa	10	27·0	12·3	20	46·4	25·6	7	22·9	43·9
Sorethroat and Influenza	3	8·1	4·1	1	2·3	13·6	1	3·3	..
Ophthalmia	3	8·1	15·0	7	16·	10·5	10	32·8	20·3
Rheumatism	15	40·5	63·9	8	18·6	22·6	8	26·2	32·1

Eruptive Fevers were much less prevalent than formerly at Sierra Leone, and the only cases which were admitted into hospital during the year were four of chicken-pox. At the Gambia, small-pox and measles were both epidemic ; of the former fourteen, and of the latter seven cases occurred. The only fatal case was one of measles.

Paroxysmal Fevers were thrice as prevalent at Sierra Leone and the Gambia as during the two preceding years, a result which might have been anticipated from the exposure of the troops while on field service. The same circumstance may account for the increased proportion of cases of dysentery and diarrhœa.

ENTHETIC DISEASES.—The admissions on account of venereal have more than doubled during the past year at Sierra Leone, but have been less numerous than formerly at the other stations. The medical officers do not state any probable cause for this change.

PARASITIC DISEASES.—Guinea worm continues to hold a prominent place in the returns from the Gold Coast, having been the cause of upwards of one-third of the whole of the admissions into Hospital There were no cases of it at Sierra Leone or the Gambia.

ACCIDENTS, VIOLENCE, &c.—Twenty-five cases of wounds received in action were admitted into hospital, fourteen in that portion of the force furnished from Sierra Leone and eleven in that from the Gambia. Two men were killed in action, and one died of his wounds on the following day. One of the men was shot through the head, the body of the other was not recovered, and the cause of death of the third was a penetrating wound of the abdomen.

The other classes of diseases do not seem to require special remark.

Three men were discharged as invalids at Sierra Leone, two for secondary syphilis and one for scrofula ; and one was discharged on the Gold Coast for *arthritis*. None were invalided at the Gambia.

The average number constantly sick at Sierra Leone was thirteen, at the Gambia fifteen, and on the Gold Coast nine. From these data we obtain the following results :—

	Sierra Leone.	The Gambia.	The Gold Coast.
Ratio per 1,000 of strength constantly sick	35·13	34·80	29·51
	Days.	Days.	Days.
Average sick time to each soldier	12·82	12·70	10·77
Average duration of cases of sickness	12·65	11·65	16·39

There is no information on these subjects in the previous reports, with which to compare these results. It will be observed, that, although the

proportion non-effective and the average sick time to each soldier are lower on the Gold Coast, the average duration of the cases of sickness there has been greater than at Sierra Leone or the Gambia. *Western Africa.*

VI.—ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF ST. HELENA.

The troops employed in this island during the year have been a battery of the Royal Artillery, a detachment of Royal Engineers, and the St. Helena Regiment. The strength of the detachment of Royal Engineers was raised from 23 to 100 by the arrival of re-inforcements from England in the end of June. *St. Helena.*

The average strength of the troops was 680; the admissions into hospital were 705, and the deaths 8, of which one occurred out of hospital. The sickness, therefore, was in the ratio of 1037 and the mortality of 11·76, per 1,000 of the strength, the former being considerably above and the latter almost identical with the average of the two preceding years.

The following Table shows the influence of the different classes of diseases upon the troops. A detailed statement of the admissions and deaths in 1861 will be found in Abstract No. XX. of Appendix.

Order.	Diseases.	Strength, 680.		Ratio per 1,000 of Strength.			
				1861.		1859-60.	
		Admitted	Died.	Admitted	Died.	Admitted	Died.
	Class I.						
1	Miasmatic diseases ..	281	3	413·2	4·41	367·2	2·16
2	Enthetic „ ..	66	..	97·1	..	82·1	..
3	Dietic „ ..	51	1	75·0	1·47	10·8	..
4	Parasitic „ ..	1	..	1·5	..	3·2	..
	Class II.						
1	Diathetic diseases.. ..	2	1	2·9	1·47	3·2	..
2	Tubercular „	2	..	2·9	..	6·5	2·16
	Class III. Diseases of the—						
1	Nervous system ..	30	2	44·1	2·94	15·1	2·16
2	Circulatory „ ..	3	..	4·4	..	13·	1·08
3	Respiratory „ ..	37	1	54·4	1·47	41·	..
4	Digestive „ ..	51	..	75·0	..	41·	1·08
5	Urinary „ ..	4	..	5·9	..	1·1	..
6	Reproductive „ ..	1	..	1·5	..	7·6	..
7	Locomotive „ ..	1	..	1·5	..	1·1	..
8	Integumentary „ ..	41	..	60·3	..	114·5	..
	Class V.						
1	Accidents	133	..	195·6	..	98·2	3·24
6	Corporal Punishment ..	1	..	1·5	..	..	..
	Diseases not specified ..	..	..	..	..	13·	..
	Total	705	8	1036·8	11·76	818·6	11·88

The admissions have been one-fifth more numerous than in the two preceding years, the increase being chiefly in accidents, dietic and miasmatic diseases, and those of the digestive system, while there has been a considerable decrease in diseases of the integumentary system.

St. Helena. Miasmatic Diseases, when subdivided into groups, give the following results :—

Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength.			
			1861.		1859–60.	
			Admitted	Died.	Admitted	Died.
Eruptive Fevers	..	..	..	..	..	..
Paroxysmal „	26	..	38·2	..	1·1	..
Continued „	68	2	100·0	2·94	198·7	..
Dysentery and Diarrhœa ..	90	1	132·3	1·47	105·8	..
Sorethroat and Influenza ..	14	..	20·6	..	11·9	..
Ophthalmia	28	..	41·2	..	15·1	..
Rheumatism	21	..	30·9	..	28·1	..

This shows an increase in all the groups except continued fevers, which have been much less prevalent than formerly. It is probable, however, that part of the great reduction in fevers of this type may be due to the large number of cases reported under the head of intemperance (*ebriositas*) in the class of dietic diseases, having been such as formerly were reported as fever. No special reason has been assigned for the increase in the admissions by the other groups of this class.

Dietic Diseases.—The only disease in this class, which has caused any admission during the year, has been intemperance (*ebriositas*), of which fifty-one cases were reported. The death under this head was that of a private of the St. Helena Regiment who, while on sentry, drank off a bottle of rum at a draught. With reference to the great amount of intemperance, the Surgeon of the St. Helena Regiment observes, that "few bodies of men environed by a network of wine shops, and subject at occasional intervals to visits of men-of-war, whose sailors come on shore by hundreds to spend within a few days sums of almost incredible amount, and which they share with the soldier, could be expected to behave better."

Diseases of the Digestive System.—The increase in the admissions by this class of diseases has been chiefly due to dyspepsia and hepatic affections, both of them probably arising from the intemperate habits of the men.

The other diseases seem scarcely to require special remark.

During the year one man was sent home recommended for discharge from the service on account of ophthalmia, and six were invalided for change of climate, their diseases being ophthalmia, secondary syphilis, stricture of urethra, disease of heart, fracture, and sprain. Eight men were finally discharged at Chatham for the following disabilities :—

Rheumatism	1
Ophthalmia	1
Venereal..	1
Paralysis	1
Cardiac disease	1
Dysentery and Hepatic disease	1
Loss and impaired use of limbs	2
	8

The average number constantly non-effective from sickness was twenty four, or 35·3 per 1,000 of the strength. From this we deduce the average sick time to each soldier to have been 12·88 days, and the average duration of the cases 12·42 days. The mean daily sick and average sick time to each man are rather lower than in previous years, and the duration of the cases has been from three to four days under the previous average, so that, although, as already seen, the admissions into hospital were more numerous than formerly, the increase has been from diseases easily amenable to treatment.

The influence of age on mortality is shown by the following Table.

St. Helena.

	Under 20.		20-24.		25-29.		30-34.		35-39.		40 and upwards.	
	Strength on 1st April.	Died during year.	Strength on 1st April.	Died during year.	Strength on 1st April.	Died during year.	Strength on 1st April.	Died during year.	Strength on 1st April.	Died during year.	Strength on 1st April.	Died during year.
Troops	43	..	298	3	242	3	113	1	18	1	4	..
Ratio per 1,000	..	..	..	10·07	..	12·40	..	8·85	..	55·55	..	..

No information on this subject was available for former reports, and the numbers are at present too limited to justify any deductions.

VII.—ON THE HEALTH OF THE TROOPS SERVING AT THE CAPE OF GOOD HOPE.

Cape of Good Hope.

Section I.

Sickness and Mortality.

In the middle of September the 2nd Battalion 11th Regiment arrived from England, and on the 20th of October the 59th Regiment embarked at Port Natal for England. With these exceptions, the troops employed in the Command remained the same as at the close of 1860. The average strength of the troops during the year was 4,598; the admissions into hospital amounted to 3,974, the deaths to 32 in and 12 out of hospital, and 2 invalids died, one on the passage home and the other immediately after landing at Portsmouth. These numbers give a ratio of 864 admissions, and 10· deaths per 1,000 of the mean strength.

The sickness and mortality occurred in the different corps as follows:—

	Average Annual Strength.	Admissions into Hospital.	Deaths.				Annual ratio per 1,000 of Mean Strength.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery	161	140	..	1	..	1	870	6·21
Royal Engineers.. ..	215	215	2	..	..	2	1,000	9·30
2nd Bat. 10th Regiment.	822	515	4	2	..	6	626	7·30
„ 11th „	259	393	3	1	..	4	1,518	15·44
„ 13th „	840	534	5	2	..	7	636	8·33
59th Regiment	587	628	6	2	1	9	1,070	15·33
85th „	784	704	4	2	1	7	898	8·93
Cape Mounted Rifles ..	844	703	3	2	..	5	833	5·92

Of the remaining five deaths four occurred in a detachment of the Army Hospital Corps, and the other was that of a trained garrison schoolmaster.

The 2nd Battalion 11th Regiment furnished the highest annual ratio of admissions during the short period it was in the Command. This arose from the great amount of venereal and itch in the corps, these diseases having been the cause of 169 out of 393 admissions. The 59th Regiment also furnished a high proportion of admissions and deaths, but it, like the 11th, was in the colony during only part of the year.

The diseases by which the admissions into hospital and deaths were caused are detailed in Abstract No. XX. of Appendix, from which and previous reports the following Table has been prepared.

Cape of Good Hope.

Order.	Diseases.	1861. Mean Strength, 4,598. Admitted.	Deaths. At Cape.	Deaths. Invalids.	Deaths. Total.	Ratio per 1,000 Admitted.	Ratio per 1,000 Died.	1859–60.* Ratio per 1,000 of Mean Strength. Admitted.	Died.
	Class I.								
1	Miasmatic diseases ..	1,336	6	..	6	290·6	1·30	274·7	2·79
2	Enthetic „ ..	864	..	..	..	187·9	..	154·6	·13
3	Dietic „ ..	68	2	..	2	14·8	·43	5·4	·51
4	Parasitic „ ..	54	..	..	..	11·7	..	20·9	..
	Class II.								
1	Diathetic diseases ..	8	1	..	1	1·7	·22	4·3	..
2	Tubercular „ ..	38	5	2	7	8·3	1·52	10·6	1·39
	Class III.. Diseases of the—								
1	Nervous system ..	116	7	..	7	25·2	1·52	26·5	1·39
2	Circulatory „ ..	95	5	..	5	20·7	1·09	28·1	1·51
3	Respiratory „ ..	269	7	..	7	58·5	1·52	69·9	·63
4	Digestive „ ..	200	5	..	5	43·5	1·09	46·7	1·14
5	Urinary „ ..	8	..	..	..	1·7	..	2·0	·25
6	Reproductive „ ..	57	..	..	..	12·4	..	6·1	..
7	Locomotive „ ..	23	..	..	..	5·0	..	4·3	..
8	Integumentary „ ..	412	..	..	..	89·6	..	113·1	..
	Class IV.								
4	Diseases of Nutrition ..	2	..	..	..	·4	..	1·0	..
	Class V.								
1	Accidents	405	5	..	5	88·1	1·09	90·3	1·90
3	Homicide	..	..	..	..	..	..	..	·13
4	Suicide	..	1	..	1	..	·22	·1	·25
6	Corporal Punishment ..	19	..	..	..	4·1	..	4·0	..
	Diseases not specified ..	..	..	..	..	..	..	20·6	..
	Total	3,974	44	2	46	864·2	10·00	883·2	12·02

There has been an increase in miasmatic and enthetic diseases, and a decrease in those of the integumentary system.

Miasmatic Diseases, when subdivided, give the following results :—

Diseases.	Admitted	Died.	Annual Ratio per 1,000 of Strength. 1861. Admitted	1861. Died.	1859–60. Admitted	1859–60. Died.
Eruptive Fevers	12	..	2·6	..	2·9	·12
Paroxysmal „	35	..	7·6	..	11·4	..
Continued „	220	4	47·8	·87	50·9	1·39
Dysentery, Diarrhœa, and Cholera	185	2	40·2	·435	48·1	1·27
Sorethroat and Influenza ..	73	..	15·9	..	19·1	..
Ophthalmia	252	..	120·	..	94·4	..
Rheumatism	198	..	43·1	..	40·6	..

This Table shows no important difference from the previous results except in ophthalmia, which has given rise to a proportion of admissions

* The 59th Regiment in 1859 has been omitted in preparing this Table, for reasons which were fully detailed in the Report for that year

considerably above the average. This has been caused by its prevalence in the 2nd Battalion 10th Regiment, in which 229 cases occurred. The 85th Regiment, in which ophthalmia prevailed to a great extent in 1860, was comparatively free from it, the admissions having been little more than half the amount of the previous year. The Surgeon of the 10th Regiment states, that he has not been able to satisfy himself as to its causes. It appears to have prevailed without much variation in the different months till August, when it began to abate and reached its minimum in November. *Cape of Good Hope.*

Dietic Diseases have given rise to a much higher proportion of admissions than in 1860, and in the present return they have all been caused by intemperance (*ebriositas*).

Accidental and Violent Deaths have amounted to six, of which five were accidental by drowning and one suicidal by cutting his throat.

Corporal Punishment was inflicted in nineteen instances, being in the ratio of 4·1 per 1,000 of the strength and almost identical with the average of the two preceding years.

Section II.

On the Extent of Invaliding.

During the year there were 70 men sent home from the Cape recommended to be discharged as invalids, and 61 for change of climate, being in the annual ratio of 15·2 and 13·3 per 1,000 of the mean strength. The following Table shows the classes of diseases which occasioned their being sent home.

Diseases.	Number sent Home.	
	Recommended for Discharge.	For Change of Climate.
Ophthalmia	11	4
Dysentery	1	1
Rheumatism	10	7
Venereal	1	7
Dropsy	1	..
Tubercular Diseases	8	4
Diseases of the—		
Nervous system	9	12
Circulatory ,,	10	16
Respiratory ,,	3	5
Digestive ,,	3	2
Reproductive ,,	1	..
Locomotive ,,	..	2
Integumentary ,,	2	..
Diseases of Nutrition	7	1
Accidents and Violence	3	..
Total	70	61
Ratio per 1,000 of Mean Strength	15·2	13·3

Diseases of the circulatory and nervous systems, rheumatism, and ophthalmia have been the chief causes of disability among the invalids. The first two of these classes are, it is to be feared, in a great measure the result of the intemperate habits of the men. Inspector-General Taylor, C.B., the principal medical officer, quotes the following extract from a report made in 1838 by the late Deputy Inspector-General Dr. Nicholson upon the prevalence of disease of the heart among the troops at the Cape:—"It would be difficult to account in any satisfactory manner why diseases of this nature should affect soldiers here more frequently than at other stations; their habits in all situations being so nearly alike, and in this climate there is nothing peculiar which can be supposed to favour their production. I believe that here and

Cape of Good Hope.

elsewhere we must look on intemperance as among the chief causes of the disease under consideration, by keeping up an excitement of the circulation aggravated by high atmospheric temperature; long continued gastric derangement, induced by the same cause, acting remotely on the heart and ultimately terminating in organic lesion, may also be set down as a probable cause. As rheumatic affections, too, are in this climate so very prevalent and marked by such peculiar severity, may it not be supposed, that many of the complaints of the heart have their origin in that disease by the translation of the morbid action."

There were 82 invalids from the Cape finally discharged the service at Chatham, being in the ratio of 17·8 per 1,000 of mean strength. This is slightly in excess of the average of previous periods, which was 15 per 1·000 in the twelve years from 1825 to 1836 inclusive. The disabilities, for which the invalids were discharged in 1861, were as follows :—

Eye diseases	22
Rheumatism	4
Venereal	2
Cachexy and Scrofula	4
Pulmonary disease	7
Weakly Constitution	2
Mental disease	5
Epilepsy	4
Deafness	1
Cardiac disease	20
Dysentery and Hepatic diseases	3
Dropsy and Visceral diseases	3
Stricture and Urinary diseases	1
Ulcers and Varices	1
Loss and impaired use and disease of Limbs	3
	82

This statement shows ocular and cardiac diseases to have been the cause of discharge of half of the invalids from the Cape. The number discharged for pulmonary disease was exactly the same as in 1860.

Section III.

Mean Daily Sick.

The average number constantly non-effective from sickness during the year was 205, or 44·58 per 1,000 of the strength. The following Table shows the average sick time to each soldier and the average duration of the cases of disease compared with the results of 1860.

	1861.	1860.
Ratio per 1,000 of Strength constantly Sick	44·58	49·13
	Days.	Days.
Average Sick time to each Soldier	16·27	17·93
Average duration of cases of Sickness	18·83	21·09

There has been a slight reduction in all these particulars compared with the preceding year. On comparing the ratios with those for the troops serving in the United Kingdom, they will be found to be slightly under the Infantry and above the Cavalry.

Cape of Good Hope.

Section IV.

On the Influence of Age on the Mortality.

In Abstract No. XXI. of Appendix will be found a statement of the numbers serving, and the deaths at each age in quinquennial periods of life. The following Table shows the ratio of mortality at each period compared with the results for the two preceding years.

Age.		Under 20.	20–24	25–29	30–34	35–39	40 and upwards.
Ratio of Deaths per 1,000 living	1861 ..	3·63	8·09	8·24	6·40	13·89	81·08
	1859–60	8·39	11·94	9·90	11·91	16·57	11·49

The mortality does not show the same rapid advance with increasing years that has been observed in most of the other Military Commands, and which was found at the Cape in previous investigations. It would, however, be necessary to have more extensive data on this subject to justify our drawing any positive deductions. The high rate in 1861 at the age of 40 and upwards is simply a result of very limited numbers under observation.

VIII.—ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF MAURITIUS.

Section I.

Sickness and Mortality.

Mauritius.

The average strength of the troops serving in the Mauritius throughout the year was 1,921 ; there were 1,168 admissions into hospital among them, and 23 deaths, of which 5 were out of hospital. No deaths occurred among the invalids. These numbers give the proportion of 608 admissions and 11·97 deaths per 1,000 of the strength, being little more than half the average of the two preceding years.

The admissions and deaths were distributed as follows in the different corps :—

	Mean Strength for the Year.	Admissions into Hospital.	Deaths.	Ratio per 1,000 of Mean Strength.	
				Admitted	Died.
Royal Artillery	116	78	2	672	17·24
Royal Engineers	188	112	1	596	5·32
2nd Batt., 5th Regiment ..	780	458	10	587	12·82
„ 24th „ ..	831	515	9	982	10·83

The other death was that of a serjeant on the General Staff.

The following Table shows the admissions into hospital and deaths by the principal classes of diseases. The details for 1861 will be found in Abstract No. XX. of Appendix.

Mauritius.

Order.	Diseases.	Strength, 1,921. Admitted	Died.	1861. Ratio per 1,000. Admitted	Died.	1859–60. Ratio per 1,000. Admitted	Died.
	Class I.						
1	Miasmatic Diseases ..	417	8	217·1	4·17	463·1	12·74
2	Enthetic „ ..	79	..	41·1	..	75·2	..
3	Dietic „	31	1	16·1	·52	15·3	..
4	Parasitic „	15	..	7·8	..	14·9	..
	Class II.						
1	Diathetic Diseases ..	3	..	1·6	..	6·0	..
2	Tubercular „	8	2	4·2	1·04	17·8	1·59
	Class III. Diseases of the—						
1	Nervous System ..	43	1	22·4	·52	29·3	1·27
2	Circulatory „	12	2	6·2	1·04	16·2	·32
3	Respiratory „	48	1	25·0	·52	108·9	·64
4	Digestive „	124	5	64·5	2·60	98·4	·64
5	Urinary „	3	..	1·6	..	3·8	..
6	Reproductive „	25	..	13·0	..	5·4	..
7	Locomotive „	16	..	8·4	..	3·5	..
8	Integumentary „	196	..	102·0	..	183·1	..
	Class IV.						
4	Diseases of Nutrition ..	14	..	7·3	..	14·0	·32
	Class V.						
1	Accidents	130	1	67·7	·52	82·5	1·91
4	Suicide	1	2	·5	1·04	0·6	1·27
6	Corporal Punishment ..	2	..	1·1	..	6·4	..
	No appreciable disease ..	1	..	·5	..	..	..
	Diseases not specified ..	..	..	..	..	17·8	..
	Total	1,168	23	608·1	11·97	1,162·2	20·70

This Table shows the reduction in the admissions to have taken place chiefly in the miasmatic and enthetic diseases, and in those of the respiratory and integumentary systems, and the reduction in mortality to have been in miasmatic diseases.

Miasmatic Diseases, when subdivided into groups, give the following results:—

Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength. 1861. Admitted	Died.	1859–60. Admitted	Died.
Eruptive Fevers	..	..	..	..	1·3	..
Paroxysmal „	6	..	3·1	..	32·5	·64
Continued „	41	2	21·3	1·04	110·8	4·78
Dysentery, Diarrhœa, and Cholera	280	6	145·7	3·12	245·5	5·73
Sorethroat and Influenza ..	21	..	10·9	..	11·1	..
Ophthalmia	26	..	13·5	..	23·2	..
Rheumatism	26	..	13·5	..	34·4	..

The decrease in the prevalence of these diseases has been most marked in the group consisting of dysentery, diarrhœa, and cholera, in continued fevers, and in paroxysmal fevers. The mortality by the first of these groups would also have been greatly reduced but for an outbreak of epidemic cholera in the month of December. In the beginning of December this disease appeared among the civil population of Grand River, a village two or three miles from Port Louis. On the 8th, a cholera hospital was opened there, and between

that date and the 27th, there were 40 cases admitted, of which 24 died. On the 9th of December, a detachment of the 2nd Battalion 5th Regiment was sent from Port Louis to the rifle camp at Petite Rivière, a mile distant from Grand River. On the 22nd, a case of spasmodic cholera occurred in this detachment; on the 23rd, another case occurred; on the 24th, two cases, and on the 25th, one. Of these five cases four died. No more cases presented themselves before the end of the year, although diarrhœa was very prevalent in the detachment. The further history of the epidemic must be given in the Report for 1862. *Mauritius.*

The medical officers are disposed to attribute the diminished amount of sickness among the troops to the influence of two hurricanes in the early part of the year. The fall of rain in February, when these occurred, amounted to 46·57 inches, the total fall during the year being 66·60 inches.

Violent Deaths.—A private of the 24th Regiment was accidentally drowned at Port Louis. There were two deaths by suicide—one, of a sapper of the Royal Engineers, who shot himself, and the other, of a private of the 24th Regiment, who, while under treatment in hospital for mania, threw himself out of the window and fractured his skull; he lived only 21 hours after the receipt of the injury.

Section II.

On the Extent of Invaliding.

Only two men were sent home for change of climate, one on account of chronic rheumatism, and the other of palpitation of the heart. None were sent recommended for discharge.

Eight invalids from the Mauritius were finally discharged the service during the year, being in the ratio of 4·2 per 1,000 of the strength. The causes assigned for their discharge were—

Rheumatism	2
Consumption	2
Mental Disease	1
Epilepsy	1
Dysentery and Hepatic Disease	2
Total	8

Section III.

Mean Daily Sick.

The average daily sick throughout the year was 49, or in the proportion of 25·5 per 1,000 of mean strength. The following Table shows the average sick time to each soldier and the average duration of the cases, compared with the results of the two preceding years.

	1861.	1859–60.
Ratio per 1,000 of Strength constantly Sick	25·51	46·50
	Days.	Days.
Mean Sick-Time to each Soldier	9·31	16·97
Average duration of cases of disease	15·31	14·60

This Table shows a very marked reduction in the average number constantly sick, and in the average sick time to each soldier, but an increase of nearly a day in the duration of the cases.

Section IV.

On the Influence of Age on the Mortality.

Mauritius. The following Table shows the strength and deaths by ages in the Royal Artillery and Engineers and in the 2nd Battalion 24th Regiment. The return furnished by the Officer Commanding the 2nd Battalion 5th Regiment was so obviously incorrect, that we have been compelled to omit it.

Age	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Royal Artillery ..	2	..	54	..	30	2	18	..	8	..	1	..
Royal Engineers ..	1	..	76	..	82	1	19	..	10	..	2	..
2nd Batt., 24th Reg. ..	51	..	587	5	167	2	55	1	12	1	..	..
Total	54	..	717	5	279	5	92	1	30	1	3	..
Ratio of Deaths per 1,000 of Strength:												
1861	..		6·97		17·92		10·87		33·33		..	
1859–60 ..	8·89		19·85		12·99		9·68		100·00		..	

The numbers under observation are too small to admit of positive deductions; but they are here recorded for future use.

IX.—ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF CEYLON.

Section I.

Sickness and Mortality.

Ceylon. The troops employed in 1861 were, as in the preceding year, a battery of the Royal Artillery, the Service Companies of the 50th Regiment, the Ceylon Rifle Regiment, and a corps of Gun Lascars.

I. White Troops.

The average strength of the European troops was 907 men, among whom 1,305 admissions into hospital took place, and 15 deaths, of which two were out of hospital. In addition to these, three invalids died on the passage home or at the Invalid Depôt, making a total of 18 deaths. The ratio of admissions, therefore, was 1,440, and of deaths 19·85 per 1,000 of mean strength, being considerably under the proportion in 1860.

The following Table shows the admissions and deaths by the different classes of diseases. The details for 1861 will be found in Abstract No. XX. of Appendix.

Orders.	Diseases.	Strength, 907.				Annual Ratio per 1,000.			
		Admitted.	Died.			1861.		1859–60.	
			At Ceylon.	Of Invalids.	Total	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases	517	6	1	7	570·0	7·72	664·4	12·57
2	Enthetic „ ..	206	..	1	1	227·1	1·10	234·6	..
3	Dietic „ ..	20	..	..	..	22·1	..	9·8	..
4	Parasitic „ ..	..	..	..	..	..	..	7·6	..
	Class II.								
1	Diathetic Diseases ..	4	..	..	..	4·4	..	6·0	..
2	Tubercular „ ..	11	2	..	2	12·1	2·21	16·4	2·18
	Class III. Diseases of the—								
1	Nervous System..	46	1	1	2	50·7	2·21	57·4	3·28
2	Circulatory „ ..	9	1	..	1	9·9	1·10	18·0	·55
3	Respiratory „ ..	68	..	..	..	75·0	..	98·4	2·18
4	Digestive „ ..	147	3	..	3	162·1	3·31	213·2	4·92
5	Urinary „ ..	8	..	..	..	8·8	..	4·4	·55
6	Reproductive „ ..	24	..	..	..	26·5	..	2·7	..
7	Locomotive „ ..	5	1	..	1	5·5	1·10	4·4	..
8	Integumentary „ ..	93	..	..	..	102·5	..	181·5	..
	Class IV.								
4	Diseases of Nutrition	15	..	..	..	16·5	..	3·8	..
	Class V.								
1	Accidents	122	1	..	1	134·5	1·10	144·9	·55
4	Suicide	..	..	..	..	..	..	..	·55
6	Corporal Puuishment	4	..	..	..	4·4	..	3·8	..
	Diseases not specified	7	..	..	..	7·7	..	10·9	..
	Total	1,306	15	3	18	1,439·8	19·85	1,682·2	27·33

This Table shows a considerable reduction both in admissions and deaths compared with the average of the two preceding years. In the deaths, it has taken place in the class of miasmatic diseases, and in the admissions, chiefly in miasmatic diseases and those of the respiratory and integumentary systems.

Miasmatic Diseases, when subdivided as usual, furnish the following results:

Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength.			
			1861.		1859–60.	
			Admitted	Died.	Admitted	Died.
Eruptive Fevers..	..	..	..	..	·5	..
Paroxysmal „	109	..	120·2	..	133·4	·55
Continued „	33	..	36·4	..	62·3	..
Dysentery, Diarrhœa, and Cholera	176	7	194·0	7·72	297·4	9·84
Sorethroat and Influenza ..	11	..	12·1	..	16·9	..
Ophthalmia	119	..	131·2	..	69·4	..
Rheumatism	60	..	66·1	..	83·6	·55

This shows a reduction in all these groups of diseases except ophthalmia, the admissions by which have been nearly double the average. The reduction has been most marked in continued fevers and in dysentery, diarrhœa, and cholera.

In the middle of March, several cases of spasmodic cholera occurred among the white troops in Colombo, three of which terminated fatally. The outbreak was attributed to the effluvia from the canal in the fort, which is little better than an open sewer and was at that time very low from long continued drought. The men occupying the barrack immediately over the canal were

Ceylon. removed. Heavy rains set in shortly afterwards, filling the canal and flushing the drains, and the disease ceased. The total number of cases was 9, of which, as already stated, three died.

Ophthalmia was very prevalent in the 50th Regiment both at Kandy and Colombo; in an average strength of 163 men at the former, there were 46 cases, and in an average of 365 at the latter station, 63 were admitted. The artillery were not affected, only one case having occurred in an average strength of 113 men. Surgeon Fraser of the 50th Regiment considered the chief exciting causes of the disease to be the glare of the sun as reflected from the white sandy roads, exposure to the irritation of small particles of dust blown into the eyes, and exposure to cold by night or early in the morning.

Diseases of the Digestive Organs, although furnishing a smaller proportion of cases than formerly, are still a source of considerable inefficiency, the admissions having amounted in 1861 to 147, or 162·1 per 1,000 of mean strength. Upwards of two-thirds of these were from inflammation of the liver, a disease which has been shown in former reports to be very common in this island. In 1861 only two deaths occurred in 103 cases, being, comparatively, a low proportion.

Accidents and Violence.—Under this head only one death is reported, that of a private of the 50th Regiment at Colombo by drowning.

II. Black Troops.

The average strength of the black troops in 1861 was 1,448; the admissions into hospital were 1,939 and the deaths 14, being in the ratio of 1,339 and 9·66 per 1,000 of the strength, the former about one-third higher, and the latter rather lower than the average of the two preceding years.

The following Table, compiled from Abstract No. XX. of Appendix and from previous Reports, shows the influence of the different classes of diseases in producing sickness and mortality among the black troops.

Order.	Diseases.	Strength, 1,448.		Annual Ratio per 1,000 of Mean Strength.			
				1861.		1859–60.	
		Admitted	Died.	Admitted	Died.	Admitted	Died.
	Class I.						
1	Miasmatic Diseases ..	1,336	7	922·6	4·83	553·8	5·17
2	Enthetic „ ..	34	..	23·5	..	31·0	..
3	Dietic „ ..	3	..	2·1	..	·6	..
4	Parasitic „ ..	93	..	64·2	..	56·5	..
	Class II.						
1	Diathetic Diseases ..	2	1	1·4	·69	6·5	·64
2	Tubercular „ ..	5	1	3·4	·69	3·2	1·29
	Class III. Diseases of the—						
1	Nervous System ..	14	2	9·7	1·38	7·8	·64
2	Circulatory „ ..	1	..	·7	..	1·9	1·29
3	Respiratory „ ..	51	1	35·2	·69	40·7	·64
4	Digestive „ ..	49	1	33·8	·69	30·0	·64
6	Reproductive „ ..	22	..	15·2	..	1·6	..
7	Locomotive „ ..	1	..	·7	..	·6	..
8	Integumentary „ ..	190	..	131·2	..	152·4	..
	Class IV.						
4	Diseases of Nutrition ..	3	..	2·1	..	1·0	·32
	Class V.						
1	Accidents	131	..	90·5	..	64·3	·64
4	Suicide	1	1	·7	·69	..	·32
6	Corporal Punishment ..	3	..	2·1	..	..	..
	Diseases not specified ..	..	..	..	..	2·6	..
	Total	1,939	14	1,339·1	9·66	954·5	11·59

The great increase in the admissions into hospital has been caused by MIASMATIC DISEASES. These, when subdivided into groups, give the following results:

Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength.			
			1861.		1859–60.	
			Admitted	Died.	Admitted.	Died.
Eruptive Fevers	44	..	30·4	..	1·6	..
Paroxysmal „	923	2	637·4	1·38	291·2	1·29
Continued „	124	..	85·6	..	71·7	·32
Dysentery, Diarrhœa, and Cholera	65	5	44·9	3·45	58·1	3·55
Sorethroat and Influenza ..	4	..	2·7	..	2·3	..
Ophthalmia	81	..	55·9	..	82·7	..
Rheumatism	76	..	52·5	..	38·7	..

Eruptive Fevers.—There were 32 admissions for chicken-pox and 12 for measles, most of them at Colombo.

Paroxysmal Fevers have been the cause of the great increase in the amount of miasmatic diseases. Their excessive prevalence, however, was confined to Trincomalee, where 649 cases of intermittent fever occurred in a detachment of the average strength of 223 men, so that the admissions were nearly in the proportion of three to each man of the force.

The prevalence of ague is attributed to the marshy nature of the soil in the vicinity of the station, which is almost surrounded by paddy fields and cocoa-nut gardens. Only one case of cholera occurred among the black troops.

Ophthalmia, which, as already pointed out, was so prevalent among the white troops, was, among the black troops, under the average of the two preceding years.

VIOLENT DEATHS.—One death by suicide occurred, which was committed in an extraordinary manner. A private of the Ceylon Rifles, while under treatment for an attack of remittent fever, inflicted two deep wounds in his neck and three in his abdomen with a broken piece of a glass quart-bottle which contained his medicine. The abdominal cavity was laid open, and there was considerable hœmorrhage from all the wounds. He died from exhaustion about forty-six hours after the infliction of the wounds.

SECTION II.

On the extent of Invaliding.

There were 14 men sent to England during the year, recommended for discharge as invalids, and 31 for change of climate, amounting together to 49·6 per 1,000 of mean strength. The diseases for which they were invalided were as follows:—

Diseases.	To be Discharged.	For Change of Climate.
Ophthalmia	..	9
Dysentery	..	3
Rheumatism	4	3
Secondary Syphilis	1	2
Consumption	1	..
Amaurosis	..	1
Epilepsy	1	..
Blindness	1	..
Disease of Heart	..	2
Chronic Bronchitis	3	..
Pneumonia	..	2
Dyspepsia	..	1
Chronic Inflammation of Liver	3	7
Ulcers	..	1
Total	14	31

Ceylon. Thus it appears that disease of the liver, ophthalmia, and rheumatism have been the principal causes for which these men were sent home.

Only eleven men, who had been invalided from Ceylon, were finally discharged during the year. Their disabilities were as follows:—

Eye Diseases	7
Paralysis	1
Epilepsy	1
Pulmonary Disease..	1
Rheumatism	1
Total	11
Ratio per 1,000 of Mean Strength	12·1

Of the black troops, 35 were discharged from the service during the year, and for the following diseases:—

Ophthalmia	1	Hæmorrhoids	1
Dysentery	1	Periostitis	1
Rheumatism	10	Ulcer	2
Scrofula	1	Debility	6
Consumption	3		
Mental Imbecility	1	Total	35
Headache	1		
Bronchitis	5		
Asthma	1	Ratio per 1,000 of Mean Strength..	24·2
Hernia	1	Ditto in 1860	8·5

Rheumatism and debility are the two principal causes assigned for the discharge of these men as invalids. We have no information as to their length of service, but it is probable that a large proportion of them were old soldiers.

Section III.

Mean Daily Sick.

The average number of the white troops constantly sick in hospital during the year was 60, and of the black troops 46, being in the ratio of 66 and 32 per 1,000 of the mean strength. The following Table gives the usual deductions on this head compared with the results of the two preceding years:—

	White Troops.		Black Troops.	
	1861.	1859–60.	1861.	1859–60.
Ratio per 1,000 of Strength constantly sick..	66·15	74·80	31·77	30·67
	days.	days.	days.	days.
Average sick time to each Soldier	24·14	27·34	11·59	11·20
Average duration of cases of Sickness ..	16·77	16·25	8·66	11·73

This shows a decrease in the average constantly sick and the average sick time to each soldier of the white troops, but a trifling increase in the average duration of the cases, while the reverse is shown as regards the black troops.

SECTION IV.

Influence of Age on the Mortality.

The following Table shows the mortality at different ages among the white troops :— *Ceylon.*

Ages	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
White Troops.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Royal Artillery ..	2	..	48	1	45	..	15	1	2	..	1	..
50th Regiment ..	34	..	366	5	263	6	77	3	46	1	3	1
Total	36	..	414	6	308	6	92	4	48	1	4	1
Ratio of Deaths per 1,000 of Strength :												
1861	..		14·49		19·48		43·48		20·83		250·	
1860	..		10·50		38·91		15·62		26·31		..	

The mortality among the black troops has been as follows at the different quinquennial periods :—

Ages	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
Black Troops.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.
Ceylon Rifles	237	1	178	1	227	2	357	1	199	7	66	1
Gun Lascars	19	..	49	..	47	..	26	..	16	1	20	..
Total	256	1	227	1	274	2	383	1	215	8	86	1
Ratio of Deaths per 1,000 of Strength :												
1861	3·91		4·41		7·30		2·61		37·21		11·63	
1859	10·99		8·23		8·72		9·68		11·05		14·49	

The mortality in 1861, at the ages 35-39, has been very high, but the numbers under observation are too few to warrant our drawing any deductions from this circumstance.

X.—ON THE HEALTH OF THE TROOPS IN THE AUSTRALIAN COLONIES.

I. *Sickness and Mortality.*

I. AUSTRALIA AND TASMANIA.

The troops serving in Australia and Tasmania during 1861 consisted of Royal Artillery, Royal Engineers, a wing of the 12th, and a wing of the 40th Regiments. The average strength was 907 men, among whom there were 717 admissions into hospital, and 14 deaths, including 2 of invalids sent home to England. These numbers give a proportion of 790 admissions, and 15·44 deaths, per 1,000 of the strength, being slightly in excess of the average of the two preceding years. *Australia.*

Australia. The diseases by which the sickness and mortality were occasioned are detailed in Abstract No. XXII of Appendix. The following Table shows the influence of the different classes of diseases compared with the results of 1859-60:—

Strength 907		Australia and Tasmania.							
		1861.						1859-60.	
Orders.	Diseases.	Admitted.	Died		Total Deaths.	Ratio p. 1,000.		Ratio p. 1,000.	
			In Australia.	Of Invalids.		Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic diseases ..	234	2	..	2	258·0	2·21	223·3	2·14
2	Enthetic „	104	..	..	..	114·7	..	125·0	..
3	Dietic „	31	..	..	..	34·2	..	19·3	..
4	Parasitic „	3	..	..	..	3·3	..	·4	..
	Class II.								
1	Diathetic diseases	3	1	..	1	3·3	1·10	7·1	·36
2	Tubercular „	18	1	..	1	19·8	1·10	13·6	3·58
	Class III.								
	Diseases of the—								
1	Nervous system ..	31	4	..	4	34·2	4·42	21·1	1·43
2	Circulatory „ ..	18	..	1	1	19·8	1·10	10·7	2·14
3	Respiratory „ ..	43	1	..	1	47·4	1·10	67·5	·71
4	Digestive „ ..	29	1	..	1	32·0	1·10	47·2	·71
5	Urinary „ ..	5	1	1	2	5·5	2·21	4·3	..
6	Reproductive „ ..	3	..	..	..	3·3	..	·4	..
7	Locomotive „ ..	6	..	..	..	6·6	..	1·4	..
8	Integumentary „ ..	58	..	..	..	64·0	..	75·4	..
	Class V.								
1	Accidents	113	1	..	1	124·6	1·10	83·6	·71
4	Suicide	..	..	..	..	..	..	..	·36
6	Corporal Punishment ..	2	..	..	..	2·2	..	2·1	..
	Diseases not specified ..	16	..	..	..	17·6	..	17·5	..
	Total	717	12	2	14	790·5	15·44	719·9	12·14

Miasmatic Diseases have been more prevalent than formerly. On being subdivided they give the following results:—

	Admitted.	Died.	Annual Ratio per 1,000 of Strength.			
			1861.		1859-60.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	2	..	2·2	..	1·4	..
Paroxysmal „	6	..	6·6	..	·7	..
Continued „	30	1	33·1	1·10	18·2	·72
Dysentery, Diarrhœa, and Cholera	79	1	87·1	1·10	29·7	·36
Sorethroat and Influenza ..	24	..	26·5	..	62·5	..
Ophthalmia	21	..	23·1	..	65·0	..
Rheumatism	59	..	65·0	..	41·1	..

From this it appears that the admissions from dysentery, diarrhœa, continued fevers, and rheumatism have been in excess of the previous average, while there has been a marked decrease in those from sorethroat, influenza, and ophthalmia.

Diseases of the Nervous System have been the cause of more than one-fourth of all the deaths. Two of the fatal cases were the result of inflamma-

tion of the brain, 1 of *delirium tremens*, and 1 of mania. The admissions by *delirium tremens* amounted to 11, or 12·1 per 1,000 of the strength, and there were also 28 admissions under the head of intemperance (*ebriositas*), making a total of 43 per 1,000 of the strength from the direct effects of that vice. *Australia.*

Accidents.—The fatal case in this class was that of a private of the 40th Regiment, who in attempting, while in a state of intoxication, to break out of barracks at Hobart Town, fell from a height and fractured his skull.

II. New Zealand.

In the beginning of 1861, the troops serving in New Zealand consisted of Royal Artillery, Royal Engineers, the 2nd Battalion 14th Regiment, the 65th Regiment, and detachments of the 1st Battalion 12th, and of the 40th Regiments. In March, an additional battery of Royal Artillery joined from England, and in the end of January the 57th Regiment, and in May the 70th, arrived from India. The troops were actively engaged in field operations till the end of March, and a large proportion of them was subsequently, for a considerable time, under canvas while huts were being erected. *New Zealand.*

The amount of rain which fell in 1861 is stated to have been greatly above the average. At Auckland 57·18 inches were recorded; while the average of six years, as published by Sir H. James, was 47·10.

The average strength of the troops for the year was 4,890 men, among whom there were 3070 admissions into hospital and 68 deaths, of which 26 occurred out of hospital. These numbers give the proportion of 628 admissions and 13·90 deaths per 1,000 of the mean strength. There were no deaths among the invalids sent to England.

The diseases by which the admissions and deaths were caused, are detailed in Abstract No. XXII of Appendix. The following Table shows the influence of the different classes of diseases:—

Orders.	Average Strength ..	4,890.		Ratio per 1,000 of Mean Strength.			
	Diseases.	Admitted.	Died.	1861.		1859–60.	
				Admitted.	Died.	Admitted.	Died.
	Class I.						
1	Miasmatic diseases ..	1,161	9	237·4	1·84	156·0	1·06
2	Enthetic „ ..	166	..	33·9	..	32·1	..
3	Dietic „ ..	46	7	9·4	1·43	3·5	..
4	Parasitic „ ..	77	..	15·7	..	2·8	..
	Class II.						
1	Diathetic diseases ..	18	..	3·7	..	7·8	..
2	Tubercular „ ..	52	14	10·6	2·87	9·5	1·41
	Class III.						
	Diseases of the						
1	Nervous system ..	97	4	19·8	·82	26·1	..
2	Circulatory „ ..	26	3	5·3	·61	7·8	·70
3	Respiratory „ ..	307	3	62·8	·61	112·2	·70
4	Digestive „ ..	151	2	30·9	·41	44·1	1·06
5	Urinary „ ..	9	1	1·9	·20	1·0	..
6	Reproductive „ ..	29	..	5·9	..	1·4	..
7	Locomotive „ ..	11	..	2·2	..	2·8	..
8	Integumentary „ ..	395	1	80·8	·20	91·7	..
	Class IV.						
4	Diseases of Nutrition ..	2	..	·4	..	1·0	..
	Class V.						
1	Accidents	434	9	88·7	1·84	86·1	1·06
2	In battle	53	15	10·8	3·07	28·9	14·11
6	Corporal Punishment..	20	..	4·1	..	..	..
	Diseases not specified..	16	..	3·3	..	20·1	..
	Total	3,070	68	627·6	13·90	634·9	20·10

New Zealand. The admissions have been slightly, and the deaths one-third, below the average of the two preceding years. If, however, the deaths of the men killed in action be deducted, the mortality by disease will be found to have been considerably above the average.

Miasmatic Diseases have been more than usually prevalent. The admissions by the chief groups constituting this class were as follows :—

Diseases.	1861.				1859–60.	
	Admitted.	Died.	Ratio per 1,000.		Annual Ratio per 1,000.	
			Admitted.	Died.	Admitted.	Died.
Paroxysmal Fevers	80	..	16·4	..	..	..
Continued „	107	4	21·9	·82	2·8	·70
Dysentery and Diarrhœa ..	270	5	55·2	1·02	30·3	·35
Sorethroat and Influenza ..	215	..	43·9	..	32·1	..
Ophthalmia	215	..	43·9	..	40·6	..
Rheumatism	226	..	46·2	..	42·0	..

Paroxysmal Fevers.—With the exception of one case in the 14th Regiment, all the admissions into hospital on account of paroxysmal fevers occurred in the 57th and 70th Regiments, and were clearly the result of their previous service in India, and not attributable to the climate of New Zealand.

Continued Fevers have been more prevalent than formerly ; but, considering the circumstances in which the troops were placed for a considerable period, the excess is not so great as might have been anticipated.

Dysentery and Diarrhœa have exceeded by one-half the average of the two preceding years. Diarrhœa was the cause of 241 admissions, and dysentery of 29 admissions and 5 deaths. The fatal cases and nearly all the admissions by dysentery occurred in the 57th and 70th Regiments, which, as already stated, arrived during the year from India. Considering how universally dysentery and diarrhœa are the diseases of troops in the field, the very wet character of the season, and the necessity for keeping a large portion of the force under canvas, even after the active field operations had terminated, it is matter for congratulation that the men suffered so little from this group of diseases.

The other classes do not seem to require special comment, except that of accidents and violence. Under the former head are included 8 deaths by drowning, 4 of which occurred when the men were bathing, 3 from the upsetting of a boat, and 1 from the man falling into the harbour while drunk.

The admissions into hospital by Violence include 2 cases of incised, and 51 of gunshot, wounds received in action—of the latter 5 died in the field hospitals. There were also 10 men killed in action, making a total of 15 deaths by the hand of the enemy, being in the ratio of 3·07 per 1,000 of mean strength.

Section II.

On the extent of Invaliding.

Australian Colonies. During the year 36 men were sent home from Australia, recommended to be discharged from the service, being in the proportion of 39·7 per 1,000 of mean strength. None were sent for change of climate. From New Zealand, 78 men were sent for discharge, and 25 for change of climate, being in the ratio of 15·9 and 5·1 per 1,000 of the mean strength. The large proportion sent home from Australia compared with New Zealand, may probably be explained by the circumstance that when the detachments of the 12th and 40th Regiments were sent from Australia for field-service, the most efficient men were selected, while men with impaired constitutions, or who were likely to become soon non-effective, were retained in Australia.

The diseases for which the men were sent home are shown in the following Table :—

Diseases.	Australia.		New Zealand.	
	Recommended for Discharge from the Service.	Recommended for Change of Climate.	Recommended for Discharge from the Service.	Recommended for change of Climate.
Ophthalmia	4	..	2	1
Dysentery	1	..	..	2
Rheumatism	11	..	27	8
Stricture	2	..	..	1
Scrofula	..	..	1	..
Consumption	4	..	7	2
Mania	1	..	..	..
Amentia	..	..	3	..
Paralysis	3	..	..	2
Epilepsy	..	..	1	..
Headache	..	..	1	..
Deafness	..	..	2	..
Hypertrophy of Heart	..	..	3	..
Disease of Heart	..	..	2	..
Varicose Veins	2	..	1	..
Bronchitis	3	..	..	2
Hæmorrhoids	2	..	1	..
Varicocele	..	..	1	..
Contraction	1	..	..	..
Necrosis	1	..	..	..
Eczema	..	..	..	1
Psoriasis	1	..	..	..
Ulcers	..	..	3	..
Gunshot Wounds	..	..	1	..
Ditto received in Action	..	..	22	6
Total	36	..	78	25

This shows rheumatism to have been the chief cause of invaliding in both Australia and New Zealand; and, from the latter colony, also gunshot wounds.

The number finally discharged from the service during the year cannot be stated separately for each colony, but, collectively, amounted to 61, or 10·5 per 1,000 of the strength. The disabilities were as follows:—

Weakly Constitution	1
Dysentery and Hepatic Disease	3
Eye Diseases	5
Wounds in Action	2
Dislocations	1
Contractions	2
Mental Diseases	7
Paralysis	3
Epilepsy	2
Deafness	1
Pulmonary Diseases	9
Cardiac and Aortic Disease	5
Rheumatism	6
Ulcers and Varix	1
Stricture and Urinary Diseases	2
Worn out	1
Loss, impaired use, and disease of Limbs	10
Total	61

Annual ratio per 1,000 of mean strength { 1861 .. 10·5 ; 1859–60 .. 10·6.

Australian Colonies.

The number discharged has been almost exactly the average of the two preceding years; but one-sixth of the discharges in 1861 was from the results of injuries received on service.

Section III.

Mean Daily Sick.

The average number constantly sick in Australia and Tasmania was 35, and in New Zealand 153, being respectively in the ratio of 38·59 and 31·29 per 1,000 of the strength. The following Table shows the average sick time to each soldier, and the average duration of the cases of sickness:—

	Australia and Tasmania.		New Zealand.	
	1861.	1859–60.	1861.	1859.
Ratio per 1,000 constantly sick ..	38·59	36·49	31·29	20·48
	Days.	Days.	Days.	Days.
Average sick time to each soldier ..	14·08	13·32	11·42	7·47
Average duration of cases	17·82	18·02	18·20	11·75

There has been a considerable increase in the average non-effective from sickness in New Zealand compared with the results of 1859—an increase attributable, doubtless, to the nature of the duties on which the men were employed. The proportion in Australia corresponds closely with the average of the two preceding years.

Section IV.

On the Influence of Age on Mortality.

No returns of the ages of the men have been received from Australia nor from the detachments of the 12th and 40th Regiments serving in New Zealand. The following Table shows the mortality, at different periods of life, in the other corps, except the 57th and 70th Regiments, which have been excluded in consequence of having been in New Zealand during only a portion of the year:—

	Under 20 Years.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Royal Artillery ..	19	..	86	3	100	2	58	1	21	..	8	..
1st Bat. 14th Regt.	516	2	426	8	99	2	31	..	5	..	..	..
65th Regiment ..	61	..	281	2	327	5	324	1	133	4	23	1
Total	596	2	793	13	526	9	413	2	159	4	31	1
Ratio of deaths per 1,000 of strength — 1861	3·36		16·39		17·11		4·84		25·16		32·26	
Ratio of deaths per 1,000 of strength — 1859	..		1·94		6·91		7·06		26·59		23·81	

The mortality above 35 shows a very marked increase, but the numbers under observation are too limited to justify any positive deductions.

XI.—ON THE HEALTH OF THE TROOPS SERVING IN CHINA.

Section I.

Sickness and Mortality.

China. The force employed in China in the beginning of 1861 consisted of the following corps :—

Royal Artillery,
Royal Engineers,
1st Battalion Military Train,
31st Regiment,
44th Regiment,
2nd Battalion 60th Regiment,
67th Regiment,
99th Regiment,
Detachments Army Hospital and Commissariat Staff Corps,
Fane's Horse (afterwards 19th Bengal Cavalry),
3rd Bombay Native Infantry,
5th „ „
21st Madras „
11th Punjaub Infantry (afterwards 22nd Bengal Native Infantry),
The Regiment of Loodianah,
Gun Lascars.

In May the 21st Madras Native Infantry and the Regiment of Loodianah returned to India. In October the 1st Battalion Military Train and 2nd Battalion 60th Regiment embarked for England ; a battery of Royal Artillery, the 44th Regiment, the 19th Bengal Cavalry, and 3rd Bombay Native Infantry for India ; and in November a battery of Artillery left the Command for the Mauritius, and a company of Royal Engineers for England.

The average strength of the European troops throughout the year was 6,145 men, among whom 10,614 admissions into hospital and 220 deaths occurred, 18 of the invalids also died on their passage home, or at the Invalid Depôt, making the total mortality 238. These numbers give the ratio of 1,727 admissions and 40·56 deaths per 1,000 of mean strength, being considerably under the proportion in 1860.

The average strength of the Native troops employed was 3,128 ; the cases of sickness among them amounted to 3,958, and the deaths to 89, being in the annual ratio of 1,265 and 28·45 per 1,000 of the strength. The former is more than one-third and the latter is 3½ per 1,000 under the ratio of 1860.

In examining the details of the sickness and mortality we shall, as in last Report, divide the force into the portion serving in Southern and that in Northern China, including in the former Hong Kong, Kowloon, Canton, and Shanghae, and in the latter Tien-tsin and the Taku Forts.

Southern China.

I.—White Troops.

The average strength of the European troops in Southern China was 3,022 ; the admissions into hospital were 6,209, and the deaths 61, being in the annual ratio of 2,054 and 20·19 per 1,000 of the strength. It is impossible to apportion correctly to the troops in South and North China respectively the number of invalids who died on the passage home, but if one-half of them be added to each the ratio of deaths in Southern China would amount to 23 per 1,000 of the strength. Compared with the results of the two preceding years there has been a reduction in the admissions to the extent of nearly one fourth, and in the deaths within the limits of the Command of upwards of one-half.

The diseases by which the admissions into hospital and deaths have been occasioned are detailed in Abstract, No. XXII. of Appendix. The following Table shows the influence of the various classes :—

China.

Order.	Diseases.	Admitted.	Died.	Annual Ratio per 1,000. 1861. Admitted.	1861. Died.	1859–60. Admitted.	1859–60. Died.
	Strength	3,022.					
	Class I.						
1	Miasmatic Diseases	2,982	38	986·8	12·58	1543·5	36·25
2	Enthetic „	1,544	..	510·9	..	439·5	..
3	Dietic „	173	1	57·3	·33	5·5	·24
4	Parasitic „	24	..	7·9	..	3·3	..
	Class II.						
1	Diathetic Diseases	4	..	1·3	..	8·3	..
2	Tubercular „	21	1	6·9	·33	10·7	1·18
	Class III. Diseases of the—						
1	Nervous system	79	7	26·1	2·32	38·1	2·84
2	Circulatory „	19	..	6·3	..	18·5	·71
3	Respiratory „	199	4	65·9	1·32	145·2	1·89
4	Digestive „	330	7	109·2	2·32	128·2	2·37
5	Urinary „	4	..	1·3	..	2·1	..
6	Reproductive „	25	..	8·3	..	5·5	..
7	Locomotive „	19	..	6·3	..	5·7	..
8	Integumentary „	367	..	121·4	..	178·6	·24
	Class IV.						
4	Diseases of Nutrition	55	..	18·2	..	26·5	·48
	Class V.						
1	Accidents	350	2	115·8	·66	75·8	1·42
3	Homicide	..	1	..	·33	..	..
4	Suicide	..	..	..	..	..	·24
6	Corporal Punishment ..	10	..	3·3	..	3·5	..
	Diseases not specified ..	4	..	1·3	..	62·1	·48
	Total	6,209	61	2054·5	20·19	2700·6	48·34

This Table shows the great reduction in the admissions to have been in those by the class of miasmatic diseases, but it has also affected, though in a much less degree, all the other principal classes except venereal and dietic diseases. The difference in the mortality is almost exclusively in miasmatic diseases.

Miasmatic Diseases, when subdivided, give the following results :

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Strength. 1861. Admitted.	1861. Died.	1859–60. Admitted.	1859–60. Died.
Eruptive Fevers	1	..	·3	..	·9	..
Paroxysmal „	806	10	266·7	3·38	848·4	15·87
Continued „	1,107	9	366·3	2·98	190·7	3·55
Dysentery, Diarrhœa, & Cholera	475	19	157·2	6·29	258·9	21·08
Sorethroat and Influenza ..	62	..	20·5	..	11·8	..
Ophthalmia	304	..	100·6	..	127·9	..
Rheumatism	130	..	43·0	..	101·2	..

It will be observed that the great reduction, both in admissions and deaths, has been in paroxysmal fevers and the group comprising dysentery, diarrhœa, and cholera. There has also been a reduction in the amount of ophthalmia and rheumatism ; but a considerable increase in the prevalence of continued fevers,

though without any corresponding rise in the mortality. Dr. Currie, the Principal Medical Officer, attributes the reduction in the diseases of this class partly to the coolness of the season, and partly to the improved sanitary condition of the barracks. No cases of epidemic cholera occurred during the year, and remittent fevers, which caused 47 deaths in 1860 proved fatal in only 9 cases in 1861. *China.*

Dietic Diseases have given rise to a high ratio of admissions, owing to the number of cases reported under the head of intemperance (*ebriositas*). These in 1860 were only 12, while in 1861 they amounted to 172.

The reduction in diseases of the respiratory system has been chiefly in bronchitis, and of the digestive system in dyspepsia and hepatic inflammation.

The admissions by accidents and violence have been greatly in excess of the previous average, but chiefly from slight wounds, bruises, and sprains. Only two deaths are recorded, one by drowning at Kowloon, and the other by sunstroke at Canton.

Corporal punishment was inflicted in ten instances, being in the proportion of 3·3 per 1,000 of the strength, or very nearly the average of the two preceding years.

II.—Native Troops.

The average strength of native troops in the South of China throughout the year was 2,890 ; the admissions into hospital among them were 3,717, and the deaths 87 ; being in the annual ratio of 1,286 and 30·10 per 1,000 of mean strength. These results show a decrease of upwards of one-third in the sickness, and one-fourth in the mortality, compared with the average of the two preceding years. The admissions have been lower, but the proportion of deaths nearly one-third higher than among the white troops.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. XXII. of Appendix, and the following Table shows the influence of the different classes :—

Orders.	Diseases.	Native Troops.				1859–60.	
		Strength, 2,890.		Ratio per 1,000.		Ratio per 1,000.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.						
1	Miasmatic Diseases ..	2,656	53	919·0	18·34	1537·2	30·41
2	Enthetic „ ..	197	3	68·2	1·03	112·1	·42
3	Dietic „ ..	4	..	1·4	..	4·2	..
4	Parasitic „ ..	41	..	14·2	..	65·6	..
	Class II.						
1	Diathetic Diseases ..	42	1	14·5	·35	13·7	·42
2	Tubercular „ ..	7	3	2·4	1·03	4·4	·62
	Class III. Diseases of the—						
1	Nervous system..	48	1	16·6	·35	22·1	·83
2	Circulatory „ ..	2	1	·7	·35	2·7	·42
3	Respiratory „ ..	188	9	65·1	3·11	99·3	2·29
4	Digestive „ ..	126	1	43·6	·35	77·7	1·04
5	Urinary „ ..	6	..	2·1	..	2·7	..
6	Reproductive „ ..	1	1	·4	·35	2·9	..
7	Locomotive „ ..	3	..	1·0	..	1·5	..
8	Integumentary „ ..	176	..	60·9	..	143·3	·42
	Class IV.						
4	Diseases of Nutrition.	46	12	15·9	4·15	45·4	2·71
	Class V.						
1	Accidents	168	2	58·1	·69	79·4	1·24
6	Corporal Punishment.	1	..	·4	..	·8	..
	Diseases not specified	5	..	1·7	..	2·7	·42
	Total ..	3,717	87	1286·2	30·10	2217·7	41·24

China. While there has been a decrease in the proportion of admissions by every class of diseases except diathetic, the most marked difference has been in miasmatic diseases. These, when subdivided into groups, give the following results:—

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1861.		1859–60.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers.. ..	9	..	3·1	..	1·5	..
Paroxysmal „	1,743	8	603·1	2·77	1063·1	14·16
Continued „	75	5	25·9	1·73	45·2	1·87
Dysentery, Diarrhœa, and Cholera	481	39	166·4	13·49	281·6	12·49
Sorethroat and Influenza ..	40	..	13·8	..	1·2	..
Ophthalmia..	37	..	12·8	..	19·8	..
Rheumatism	258	1	89·3	·35	120·4	1·46

There has been a very great reduction both in the admissions and deaths by paroxysmal fevers. The admissions by dysentery, diarrhœa, and cholera were also much below the average, but without any corresponding decrease in the deaths, which were rather higher than the average, and considerably above the proportion in 1860, when they amounted to 7·88 per 1,000 of the strength.

Enthetic Diseases (*Venereal*) have undergone a considerable reduction, and their prevalence among the native as compared with the European troops, has been in proportion of only one to seven.

Diseases of Nutrition have occasioned relatively a high rate of mortality, the deaths having amounted to 4·15 per 1,000 of the strength. They have not been the subject of special remark by the medical officers. They were probably, for the most part, cases of atrophy following repeated attacks of fever; but, in the absence of specific information, this must be considered a mere conjecture.

North China.

In the middle of November 1860, upon the removal of the Expeditionary Force from the North of China, a large garrison was left at Tien-tsin with a detachment at the Taku Forts. In October 1861 it was reduced by the withdrawal of a battery of Artillery, the 2nd Battalion 60th Regiment, and Fane's Horse, and in November of another battery of Artillery. Tien-tsin was finally given up to the Chinese in April 1862.

Before entering upon the examination of the details respecting the health of the troops it appears necessary to make a few remarks upon the climate of this station. From the date of occupation of Tien-tsin, in November 1860, till the end of February 1862, meteorological observations were carefully made by Surgeon Lamprey, of the 67th Regiment. These have been condensed into a general Table, which will be found in the Appendix, No. XXXI.

Dr. Lamprey thus sums up his description of the climate of Tien-tsin: "The climate of Tien-tsin may be characterised as follows—An extremely cold and prolonged winter and a summer of more than tropical heat. Throughout the year there is an easy progress from one season to the other without sudden alternations of temperature—a remarkably dry atmosphere and a great predominance of blue sky at all seasons. Dust storms and hot winds are liable to occur at certain periods."

An examination of the Table will completely establish Dr. Lamprey's remarks as to the remarkable dryness of the atmosphere, the mean degree of humidity in each month in 1861 ranging between 42 in April and 70 in January. The latter, or highest monthly mean, is under that recorded by the Royal Engineers at Hong Kong in any month in the six years 1853-8,

except May 1853, November 1856, and January, February, and August 1858.* *China.*

The number of days on which rain fell at Tien-tsin in 1861 was 57, while at Hong Kong it was 117, and the quantity which fell was 14·61 and 75·94 inches at each respectively.

White Troops.

The average strength of the European troops in the north of China was 3,113 ; the admissions among them amounted to 4,405, and the deaths to 159, being in the ratio of 1,415 and 51·08 per 1,000, and if half the deaths among the invalids be added, it will raise the mortality to 54 per 1,000, or more than double the ratio in South China.

The diseases of the troops in North China are stated in detail in Abstract No. XXII. of Appendix, and the prevalence of the various classes is shown in the following Table. As it would be impossible to institute any useful comparison between the diseases which occurred at Tien-tsin in 1861 and in the North of China in 1860, when the army was in the field, the results for the troops in the South of China in 1861 have been substituted for the latter in this Table.

Orders.	Average Strength .. / Diseases.	3,113. Admitted.	3,113. Died.	Ratio per 1,000. Admitted.	Ratio per 1,000. Died.	South China. Ratio per 1,000. Admitted.	South China. Ratio per 1,000. Died.
	Class I.						
1	Miasmatic Diseases ..	2,181	99	700·6	31·80	986·8	12·58
2	Enthetic „ ..	743	..	238·7	..	510·9	..
3	Dietic „ ..	63	1	20·2	·32	57·3	·33
4	Parasitic „ ..	47	..	15·1	..	7·9	..
	Class II.						
1	Diathetic Diseases ..	8	..	2·6	..	1·3	..
2	Tubercular „ ..	18	9	5·8	2·89	6·9	·33
	Class III. Diseases of the—						
1	Nervous system..	91	8	29·2	2·57	26·1	2·32
2	Circulatory „ ..	22	4	7·1	1·29	6·3	..
3	Respiratory „ ..	429	9	137·8	2·89	65·9	1·32
4	Digestive „ ..	264	7	84·8	2·25	109·2	2·32
5	Urinary „ ..	6	..	1·9	..	1·3	..
6	Reproductive „ ..	22	..	7·1	..	8·3	..
7	Locomotive „ ..	9	..	2·9	..	6·3	..
8	Integumentary „ ..	223	..	71·6	..	121·4	..
	Class IV.						
4	Diseases of Nutrition.	..	..	..	..	18·2	..
	Class V.						
1	Accidents	235	20	75·5	6·43	115·8	·66
3	Homicide	..	..	..	..	..	·33
6	Corporal Punishment	21	..	6·7	..	3·3	..
	Diseases not stated ..	23	2	7·4	·64	..	..
	Total ..	4,405	159	1415·0	51·08	2054·5	20·19

This Table shows the proportion of admissions into hospital to have been nearly one-third lower than in South China, but the mortality to have been more than twice as high. The difference in the admissions has been most marked in miasmatic, enthetic, and dietic diseases, in those of the respiratory,

* Abstracts of the Meteorological Observations taken at the Stations of the Roya Engineers. Edited by Colonel Sir Henry James, R.E. London, 1862.

China. digestive, and integumentary systems, and in accidents; while the excess of deaths has been almost entirely in miasmatic diseases and accidents.

Miasmatic Diseases, when subdivided into groups, give the following results:—

European Troops.	North China.				South China.	
	Admitted.	Died.	Ratio per 1,000.		Ratio per 1,000.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	15	2	4·8	·64	·3	..
Paroxysmal „	243	5	78·1	1·61	266·7	3·38
Continued „	564	29	181·2	9·31	366·3	2·98
Dysentery, Diarrhœa, and Cholera	956	63	307·1	20·24	157·2	6·29
Sorethroat and Influenza ..	46	..	14·8	..	20·5	..
Ophthalmia..	202	..	64·9	..	100·6	..
Rheumatism	149	..	47·9	..	43·0	..

Eruptive Fevers.—All the admissions in this group were by small-pox, which prevailed among the troops at Tien-tsin during the six weeks of their occupation in 1860, and continued till the end of March. During that period 34 cases and 4 deaths occurred, of which 19 and 2 were in 1861. The men attacked were all reported to have marks of previous vaccination.

Paroxysmal Fevers were only one-third as prevalent in the North as in the South, and it is stated by the Medical Officers that most of the men affected had previously had ague in South China.

Continued Fevers have only prevailed to half the extent in the North, but have given rise to rather more than treble the mortality.

Dysentery Diarrhœa and Cholera.—It is to this group that the high rate of mortality by miasmatic diseases in the North is chiefly due; they have caused two-fifths of the whole deaths, and have been twice as prevalent and nearly thrice as fatal as in South China. Of the 60 deaths 32 were reported to have been caused by dysentery, 21 by diarrhœa, and 7 by cholera. Their great prevalence and mortality was in the quarter July to September, the season characterised by the highest mean temperature.

Enthetic Diseases were only half as common in the North as in the South, and the relative proportion of syphilitic to gonorrhœal cases was also lower.

Tubercular Diseases were rather less prevalent in the North than the South, but gave rise to a much higher rate of mortality. It is impossible, however, to say whether this may not have been influenced by the greater facilities for invaliding in the latter.

Diseases of the Nervous System.—A case of hydrophobia occurred in the detachment at the Taku Forts and terminated fatally. The particulars of the case are not given in the report of the Medical Officer, but the patient, a lance-corporal of the Commissariat Staff Corps appears by the returns to have been admitted into hospital on the 24th and to have died on the 27th February.

Diseases of the Respiratory System were the cause of a large number of admissions at Tien-tsin, chiefly by bronchitis in January and February, in which months the mean temperature was 19·7° and 23·8°.

Accidents and Violence.—Under this class 20 deaths appear among the troops in the North, but 19 of these ought rather to have been placed among the diseases of the nervous system, having been caused by sunstroke or heat apoplexy. This affection gave rise to 59 admissions and 19 deaths, most of them between the 17th and 23rd of July. The temperature during that time was extremely high, as will be seen by the following extract from Dr. Lamprey's Return:

Date.	Maximum Temperature in shade.	Minimum Temperature in shade.
	°	°
July 16, 1861	105	75
„ 17, „	95	73·5
„ 18, „	104	77
„ 19, „	105	80
„ 20, „	108	82
„ 21, „	107	83
„ 22, „	108	82
„ 23, „	105	81
Average	104·6	79·2
Average of Month	96·6	73·6

On the 24th the thermometer fell 11° or to 96°, and did not again rise higher than that point.

Corporal Punishment, which, during the period the army was in the field, had risen to 15·3 per 1,000 of the strength, was inflicted in 21 instances, being in the ratio of 7·4 per 1,000, or more than double the amount among the troops in South China.

Native or Asiatic Troops.

The Asiatic troops employed in the North of China consisted of Fane's Horse, and they remained only nine months in the Command. Their average strength was 318; the admissions into hospital were 241, and the deaths 2. These numbers, when reduced to the *annual* ratio per 1,000 of mean strength, give the proportion of 1,013 admissions and 8·40 deaths per 1,000 of mean strength.

The diseases are detailed in Abstract No. XXII. of Appendix, from which the following Table has been framed:—

Order.	Diseases.	Average *Annual* Strength, 238.			
		Admitted.	Died.	Ratio per 1,000.	
				Admitted.	Died.
	Class I.				
1	Miasmatic Diseases	105	1	441·2	4·20
2	Enthetic „	36	..	151·3	..
	Class II.				
1	Diathetic Diseases	4	..	16·8	..
2	Tubercular „	1	..	4·2	..
	Class III.				
	Diseases of the—				
1	Nervous system	1	..	4·2	..
3	Respiratory „	18	..	75·6	..
4	Digestive „	12	..	50·4	..
8	Integumentary „	19	..	79·8	..
	Class IV.				
4	Diseases of Nutrition	1	1	4·2	4·20
	Class V.				
1	Accidents	40	..	168·1	..
6	Corporal Punishment	4	..	16·8	..
	Total ..	241	2	1012·6	8·40

This Table shows a lower rate of admissions than among the native troops in South China, the difference being almost entirely in miasmatic diseases. The mortality amounts to little more than one-fourth that of the South, the

China exemption occurring entirely in the same class. The number of men employed in North China, however, was too small to justify our drawing any positive deductions from these results.

Section II.

On the extent of Invaliding.

During the year there were 392 men of the European force sent to England for change of climate, being in the ratio of 63·8 per 1,000 of mean strength.

The causes assigned for invaliding these men were as follows:—

Intermittent Fevers	12	Inflammation of Lungs	2
Continued „	15	Hernia	2
Ophthalmia	34	Dyspepsia	2
Dysentery	79	Fistula	1
Diarrhœa	36	Inflammation of Liver	30
Rheumatism	52	Abdominal Dropsy	2
Syphilis	7	Diseased Testicles	2
Stricture	2	Inflammation of Joints	3
Dropsy	1	Contraction	1
Scrofula	3	Boils and Ulcers	2
Consumption	5	Atrophy	30
Paralysis	5	Burn	1
Delirium Tremens	1	Frostbite	1
Insanity	8	Sunstroke	2
Headache	1	Sprain	2
Inflammation of Heart and Pericardium	2	Fracture	3
Disease of Heart	12	Contusion	1
Aneurism	1	Skin Disease	1
Bronchitis	26	Total	392
Pleurisy	2		

During the same period the number of the Asiatic troops sent home to India for change of climate was 25, or 8 per 1,000 of strength, and the causes were as follows:—

Ophthalmia	1
Dysentery	13
Diarrhœa	7
Rheumatism	3
Atrophy	1
Total	25

The number of the European force finally discharged the service as invalids in 1861 was 116, or in the ratio of 18·88 per 1,000 of strength.

The disabilities which occasioned their discharge were reported as follows:—

Eye Diseases	30	Fistula	1
Rheumatism and Chronic Pains	9	Diseased Testicle	1
Venereal	4	Ulcers and Varices	4
Cachexy and Scrofula	7	Dislocations	2
Mental Diseases	8	Contractions	2
Epilepsy	2	Gunshot Wound	1
Deafness	3	Loss, Impaired use, and Disease of Limbs	10
Cardiac and Aortic Diseases	9	Worn Out	1
Pulmonary Diseases	12	Total	116
Dropsy and Visceral Disease	1		
Dysentery and Hepatic Disease	7		
Hernia	2		

From this it appears that eye diseases have given rise to more invaliding than any other disability, and that pulmonary diseases rank next in frequency.

We have no information respecting the number discharged as invalids from the native force.

Section III.

Mean Daily Sick.

The average number constantly sick among the European troops was, in South China 283, and in North China 205, and among the native troops 146 and 14 respectively. These numbers give the following results :— *China.*

	South China.		North China.	
	European Troops.	Native Force.	European Troops.	Native Force.
Ratio per 1,000 of strength constantly sick	93·65	50·52	65·85	44·02
	Days.	Days.	Days.	Days.
Average sick time to each soldier ..	34·18	18·44	24·04	16·07
Average duration of the cases of disease	16·64	14·34	16·99	15·87

This shows the proportion constantly non-effective from sickness among the European troops to have been much lower in the North than the South of China, but the average duration of the cases of sickness to have been nearly the same in each. The inefficiency from sickness among the Asiatic troops was also less in the North than the South, but the duration of disease was about a day and a half longer in the former.

Section IV.

On the Influence of Age on the Mortality.

Abstract No. XXIII. of Appendix shows the numbers serving and the deaths at each age, in quinquennial periods, in such of the European regiments as served in China during the whole of the year. For obvious reasons those corps which were in the Command during a portion of the year only are omitted. The ratio of deaths per 1,000 serving at each period of life was as follows :—

	Number serving on 1st April.	Died during the year.	Ratio of Deaths per 1,000.
Under 20	296	2	6·76
From 20 to 24	1,555	47	30·22
„ 25 to 29	864	44	50·92
„ 30 to 34	570	30	52·63
„ 35 to 39	170	7	41·18
40 and upwards	21	3	142·8

It will be seen from this Table that there is a considerable rise in the mortality in the period 25-29. The numbers under 20 and above 34 are too limited to ensure average results. Indeed, the numbers altogether are so limited as to forbid our drawing any positive deductions on the subject of the influence of age in this climate.

No Returns were forwarded of the ages of the Asiatic troops.

XII. ON THE HEALTH OF THE TROOPS SERVING IN INDIA.

Section I.

Sickness and Mortality.

India. In consequence of the annual returns from the Bengal Presidency being still in arrear, the information respecting the sickness and mortality in it has necessarily been compiled from the quarterly returns. The Reports upon the health of the troops in Madras and Bombay have, however, been prepared from the annual returns, which were received in time to be available for the purpose.

The average strength of the European troops, exclusive of those of the late Hon. East India Company, was, as shown by these Returns, 57,082; the admissions into hospital among them amounted to 102,353, and the deaths to 2,002. But there were, in addition, 95 deaths among invalids on their passage home, or at the Invalid Depots shortly after their arrival in England, which increase the total mortality to 2,097. These numbers give the proportion of 1,768 admissions, and 36·74 deaths, per 1,000 of mean strength.

The following Table shows the relative sickness and mortality in each of the Presidencies :—

	Average Strength.	Admissions into Hospital.	Deaths.			Ratio per 1000 of Mean Strength.			
						1861.		1860.	
			In India.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
Bengal	37,483	73,233	1,642	66	1,708	1,954	45·57	2,023	39·37
Madras	10,739	13,471	156	14	170	1,254	15·83	1,487	22·63
Bombay	8,860	15,649	204	15	219	1,766	24·72	1,933	31·70

These ratios show a decrease in the admissions into hospital in all the Presidencies, but less marked in Bengal than the others. There is also a reduction in the mortality of the troops in Madras and Bombay, but an increase in Bengal.

The diseases by which the sickness and mortality were caused are detailed in Abstract No. XXIV. of Appendix, from which the following Table has been prepared :—

Orders.		Bengal.						Madras.						Bombay.					
		Average Strength, 37,483.				Ratio per 1,000 of Mean Strength.		Average Strength, 10,739.				Ratio per 1,000 of Mean Strength.		Average Strength, 8,860.				Ratio per 1,000 of Mean Strength.	
		Admitted.	Died.			Admitted.	Died.	Admitted.	Died.			Admitted.	Died.	Admitted.	Died.			Admitted.	Died.
			In India.	Of Invalids.	Total.				In India.	Of Invalids.	Total.				In India.	Of Invalids.	Total.		
	Class 1.																		
1	Miasmatic Diseases..	41,751	1,276	19	1,295	1113·9	34·55	5,550	70	3	73	516·8	6·80	8,575	114	7	121	967·8	13·66
2	Enthetic „ ..	13,547	14	..	14	361·4	·37	2,788	1	3	4	259·6	·37	3,035	3	2	5	342·6	·57
3	Dietic „ ..	355	1	..	1	9·5	·03	155	1	..	1	14·4	·09	105	1	..	1	11·9	·11
4	Parasitic „ ..	230	..	..	..	6·1	..	89	..	..	..	8·3	..	101	..	..	..	11·4	..
	Class II.																		
1	Diathetic Diseases ..	180	6	..	6	4·8	·16	31	2	..	2	2·9	·19	44	1	..	1	5·0	·11
2	Tubercular „ ..	432	71	23	94	11·5	2·54	161	8	5	13	15·3	1·21	93	11	6	17	10·5	1·92
	Class III. Diseases of the—																		
1	Nervous system..	1,187	55	2	57	31·7	1·50	343	9	..	9	31·7	·84	283	12	..	12	31·9	1·36
2	Circulatory „ ..	420	16	5	21	11·2	·56	136	8	..	8	12·7	·75	71	4	..	4	8·0	·45
3	Respiratory „ ..	2,037	45	2	47	54·3	1·25	530	6	1	7	49·3	·65	487	8	..	8	55·0	·90
4	Digestive „ ..	5,112	114	9	123	136·4	3·28	1,326	31	..	31	123·5	2·89	975	34	..	34	110·1	3·84
5	Urinary „ ..	103	4	2	6	2·8	·16	25	3	..	3	2·3	·28	24	..	..	..	2·7	..
6	Reproductive „ ..	535	1	..	1	14·3	·03	120	..	..	..	11·2	..	104	..	..	..	11·7	..
7	Locomotive „ ..	221	..	..	..	5·9	..	40	..	..	..	3·7	..	50	..	..	..	5·6	..
8	Integumentary „ ..	4,008	2	..	2	106·9	·05	1,122	..	..	..	104·5	..	900	1	..	1	101·6	·11
	Class IV.																		
4	Diseases of Nutrition	288	5	1	6	7·6	·16	47	1	..	1	4·4	·09	44	..	..	..	5·0	..
	Class V																		
1	Accidents	2,768	24	..	24	73·9	·64	869	13	..	13	80·9	1·21	744	13	..	13	84·0	1·47
2	Battle	1	..	..	..	·03	..	..	..	..	..	..	..	..	..	..	..	..	..
4	Suicide..	7	6	..	6	·2	·16	..	1	..	1	..	·09	..	1	..	1	..	·11
5	Execution	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	·11
6	Corporal Punishment	39	..	..	..	1·04	..	8	..	..	..	·7	..	11	..	..	..	1·2	..
	Diseases not specified	12	2	3	5	·3	·13	130	2	2	4	12·1	·37	3	..	..	..	·3	..
	Total	73,233	1,642	66	1,708	1953·8	45·57	13,471	156	14	170	1254·3	15·83	15,649	204	15	219	1766·3	24·72

India. On comparing this with the corresponding Table in the Report for 1860, it will be found that the decrease in the admissions in all the Presidencies was chiefly in miasmatic diseases and those of the digestive system. In Bengal there is a marked increase in the mortality by miasmatic diseases, and a slight increase in that by diseases of the digestive system; but in Madras there is a decrease in the ratio by both these classes, and in Bombay by miasmatic diseases. The increase in Bengal was caused by an epidemic of cholera which raged with great severity in the third quarter of the year. Exclusive of the deaths by it, the ratio of mortality amounted only to 22 per 1,000 of the strength.

Miasmatic Diseases.—The chief groups comprised under this heading have occasioned the following amount of sickness and mortality in each of the Presidencies :—

	Bengal.		Madras.		Bombay.		Ratio per 1000 of Mean Strength.					
							Bengal.		Madras.		Bombay.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers.	222	32	7	1	29	4	5·9	·85	·6	·09	3·3	·45
Paroxysmal „ ..	17,436	74	1,369	6	4,175	17	465·2	1·97	127·5	·56	471·2	1·92
Continued „ ..	7,778	86	1,248	7	1,231	8	207·5	2·29	116·2	·65	138·9	·90
Dysentery and Diarrhœa ..	2,957	198	1,584	26	1,501	50	78·9	5·28	147·5	2·42	169·4	5·64
Spasmodic Cholera	1,423	880	70	29	48	35	38·0	23·48	6·5	2·70	5·4	3·95
Sorethroat and Influenza ..	980	1	115	..	249	..	26·1	·03	10·7	..	28·10	..
Ophthalmia ..	2,639	..	320	..	611	..	70·4	..	29·8	..	69·0	..
Rheumatism ..	2,894	3	746	..	625	..	77·2	·08	69·5	..	70·5	..

Paroxysmal Fevers.—Compared with the amount in 1860 there has been a reduction to the extent of one-half in Madras, and one-fourth in Bombay, while in Bengal there has been no change. The mortality by this group of diseases, however, has been lower than in the preceding year in all three Presidencies.

Continued Fevers have been less prevalent in all the Presidencies, and less fatal in Madras and Bombay, but particularly in the latter. In Bengal the ratio of deaths has been very slightly above that of 1860.

Dysentery and Diarrhœa have undergone a very marked diminution in their prevalence in Bengal, but without any corresponding change in mortality; in Madras, also, there has been a reduction in these diseases, while in Bombay the admissions have been nearly the same, and the deaths a little higher than in the preceding year.

Spasmodic Cholera has been the cause of a high rate of mortality in Bengal, the deaths having amounted to 23·48 per 1,000 of the strength, or more than half of the total mortality in that Presidency. In Madras there was a slight reduction, and in Bombay a very considerable one in the deaths by this disease. The proportion of deaths to cases was 1 in 1·55, being rather higher than in the preceding year, when it was 1 in 1·82.

Tubercular Diseases have given rise to a lower ratio of mortality in Madras than in 1860. In the other Presidencies the results correspond very closely in the two years. As noticed in last Report, a large proportion, amounting in the present instance to one-fourth of the deaths by these diseases, occurred among the invalids after they had left India.

Sunstroke, or heat apoplexy, has been recorded as the cause of thirty-five admissions and nine deaths. In 1860 it gave rise to thirty-eight admissions and twenty-two deaths. The reduction in the mortality has been most marked in Bombay.

Accidents, Violence, &c.—Under this class three cases of poisoning are

recorded in Madras, and ten in Bombay, none of which proved fatal. No information has been given in the Reports concerning the cases in Madras.* Three in Bombay occurred in a detachment of the 56th Regiment quartered at Surat. Ten of the men had gone to a date grove near the town where they had partaken freely of toddy, and were almost immediately afterwards attacked with the symptoms of poisoning, and strong suspicions were entertained that some irritant poison had been administered to them. After a careful inquiry, however, it was believed that the symptoms had been produced by the toddy having been mixed with a quantity of the juice which had been drawn only a day or two previously. The men all recovered. *India.*

The other diseases do not seem to require special remark.

In accordance with the plan adopted in last Report we shall now submit certain details respecting the sickness and mortality in each of the Presidencies separately.

I. Bengal.

The following Table show the amount of sickness and mortality at the principal stations in the Bengal Presidency: *Bengal*

Military Divisions.	Stations.	Average Annual Strength.	Admitted into Hospital.	Died in India.	Ratio per 1,000	
					Admitted.	Died.
Presidency ..	Calcutta	929	2,130	28	2,315	30·14
	Barrackpore	621	1,172	27	1,887	43·48
	Dum Dum	228	435	9	1,908	39·47
	Raneegunge	148	273	10	1,845	67·57
Benares ..	Hazareebaugh	939	2,242	12	2,395	12·82
	Dinapore	620	1,148	14	1,852	22·58
	Berhampore	255	472	6	1,851	23·53
	Benares	748	1,839	16	2,459	21·39
	Azimghur	35	44	1	1,257	28·57
	Goruckpore	900	1,511	16	1,679	17·78
Saugor	Saugor	666	1,708	8	2,565	12·01
	Nowgong	236	449	3	1,902	12·71
	Jubbulpore	904	2,366	19	2,623	21·02
Gwalior ..	Morar, Gwalior ..	853	2,583	185	3,028	216·88
	Fort Gwalior	254	340	10	1,339	39·37
	Lullutpore	155	982	4	6,335	25·81
	Jhansi	584	1,587	21	2,717	35·96
Oude	Allahabad	1,235	2,960	58	2,397	46·96
	Cawnpore	862	1,834	52	2,128	60·32
	Setapore	624	941	7	1,508	11·22
	Lucknow	1,827	2,372	24	1,298	13·14
	Roy Bareilly	504	436	8	865	15·87
	Fyzabad	1,106	1,806	7	1,633	6·33
	Gondah	586	834	15	1,423	25·60

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* P.S.—Staff Surgeon Crawford, then Surgeon of the 18th Royal Irish, by whom these cases were treated, has given me the following information respecting them. They were well marked cases of narcotic poisoning by Stramonium, the seeds of which had been used by the toddy drawers to poison the contents of certain vessels in which the fresh toddy was received from the tree, apparently with a view to deter the soldiers from stealing the toddy at night. Several others who had partaken of the toddy at the same time were affected in a similar manner, but not to such an extent as to require to be taken into hospital. T. G. B.

Bengal.

Military Divisions.	Stations.	Average Annual Strength.	Admitted into Hospital.	Died in India.	Ratio per. 1,000 Admitted.	Ratio per. 1,000 Died.
Rohilcund ..	Shahjehanpore	423	499	3	1,180	7·09
	Moradabad	396	626	15	1,581	37·88
	Bareilly	1,146	1,713	16	1,495	13·96
Meerut	Futtyghur	419	680	6	1,623	14·32
	Agra	710	2,064	64	2,907	90·14
	Delhi	994	2,373	97	2,387	97·58
	Meerut	1,887	3,470	102	1,839	54·05
Sirhind ..	Umballa	1,759	3,916	75	2,226	42·64
	Dugshai	944	484	6	513	6·35
	Subathoo	743	1,146	19	1,542	25·57
	Jullundur	939	910	8	969	8·52
Lahore	Meean Meer (Lahore) ..	1,219	2,893	430	2,373	352·75
	Umritsir	395	812	49	2,056	124·05
	Ferozepore	848	1,389	9	1,638	10 61
	Mooltan	161	366	4	2,273	24·84
	Sealkote	1,330	2,374	13	1,785	9·77
Peshawur ..	Rawul Pindee	1,834	3,028	15	1,651	8·18
	Campbellpore	190	250	3	1,316	15·79
	Nowshera	633	1,288	6	2,035	9·48
	Peshawur	1,604	3,942	16	2,458	9·97
	Camps,* and on the march	1,756	2,409	30	1,371	17·08
	Convalescent Stations, Detachment and Depôt Hospitals. &c. ..	1,334	4,137	96	3,101	71·96
	Total	37,483	73,233	1,642	2,105	47·21

This shows a reduction in the sickness at many of the stations, and, with the exception of Lullutpore, where a small force only was quartered, at none has the amount been equal to that at Raj Ghat, Benares, in 1860. There has, however, been a considerable increase at others, principally those in the Lahore Division, and at Agra, Saugor, Morar, Meerut, Umballa, and Peshawur. In the mortality there has also been generally a reduction, but to this there are some very marked exceptions, as Meean Meer (Lahore), Morar, Delhi, Meerut, and Umballa. The high mortality at these stations was due to the prevalence of cholera as an epidemic.

The returns unfortunately do not furnish the means of separating the admissions into hospital by each disease or class of diseases at the different stations, we are therefore restricted, in the following Table, to those which proved fatal, and, as in the previous Report, have grouped them together into the different military divisions. The deaths on the march, and at the convalescent stations and Detachment and Depôt Hospitals are not included in it.

* The troops which were encamped during the prevalence of cholera, as a sanitary measure, are not included under this head, but under the stations where they were quartered when the disease broke out among them.

Orders.	Military Divisions ..	Deaths by each Class of Diseases.										Annual Ratio per 1,000 of Mean Strength.									
		Presidency.	Benares.	Saugor.	Gwalior.	Oude.	Rohilcund.	Meerut.	Sirhind.	Lahore.	Peshawur.	Presidency.	Benares.	Saugor.	Gwalior.	Oude.	Rohilcund.	Meerut.	Sirhind.	Lahore.	Peshawur.
	Average Strength ..	1926	3497	1806	1846	6744	1965	4010	4385	3953	4261	..	..	..	..	..	..	..	..	..	..
	Class I.																				
1	Miasmatic Diseases:																				
	Eruptive Fevers ..	..	..	..	1	9	2	6	4	3	2	..	..	..	·54	1·33	1·02	1·49	·91	·76	·47
	Tonsillitis & Influenza	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	·23	..	..
	Erysipelas and Furunculus	..	..	1	..	..	..	..	1	..	..	..	..	·55	..	..	..	..	·23	..	..
	Dysentery & Diarrhœa	26	14	5	24	25	1	44	19	12	8	13·50	4·00	2·77	13·00	3·71	·51	10·97	4·33	3·04	1·88
	Cholera	13	2	..	149	45	8	144	52	438	1	6·75	·57	..	80·71	6·67	4·07	35·91	11·86	110·80	·24
	Intermittent Fevers ..	2	5	6	5	19	3	16	2	6	1	1·01	1·43	3·32	2·71	2·82	1·53	3·99	·46	1·52	·24
	Continued „ ..	3	6	6	12	10	..	24	5	7	8	1·56	1·72	3·32	6·50	1·48	..	5·98	1·14	1·77	1·88
	Rheumatism	..	..	..	..	1	..	1	..	..	..	..	..	..	..	·15	..	·25	..	..	..
2	Enthetic Diseases ..	..	1	..	..	1	1	..	3	1	..	..	·28	..	..	·15	·51	..	·68	·25	..
3	Dietic „ ..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	·15	..	·25	..	..	..
	Class II.																				
1	Diathetic Diseases ..	..	1	..	..	1	1	..	2	1	..	..	·28	..	..	·15	·51	..	·46	·25	..
2	Tubercular „ ..	7	3	1	4	13	4	5	5	7	3	3·63	·87	·55	2·17	1·93	2·04	1·25	1·14	1·77	·70
	Class III.																				
	Diseases of the—																				
1	Nervous System ..	3	9	..	8	7	3	8	2	7	3	1·56	2·57	..	4·34	1·04	1·53	1·99	·46	1·77	·70
2	Cirulatory „ ..	3	..	1	..	1	1	1	3	2	3	1·56	..	·55	..	·15	·51	·25	·68	·51	·70

Orders.	Military Divisions ..	Deaths by each Class of Diseases.										Annual Ratio per 1,000 of Mean Strength.									
		Presidency.	Benares.	Saugor.	Gwalior.	Oude.	Rohilcund.	Meerut.	Sirhind.	Lahore.	Peshawur.	Presidency.	Benares.	Saugor.	Gwalior.	Oude.	Rohilcund.	Meerut.	Sirhind.	Lahore.	Peshawur.
	Average Strength ..	1926	3497	1806	1846	6744	1965	4010	4385	3953	4261	..	..	..	..	..	..	..	..	..	..
3	Respiratory System ..	2	6	..	5	5	2	7	2	2	4	1·04	1·72	..	2·71	·74	1·02	1·74	·46	·51	·94
4	Digestive „ ..	9	12	4	7	21	7	6	6	16	4	4·67	3·44	2·21	3·79	3·11	3·56	1·49	1·36	4·05	·94
5	Urinary „ ..	..	..	1	..	3	..	..	..	..	..	..	..	·55	..	·44	..	..	..	..	..
8	Integumentary „ ..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	·25	..
	Class IV.																				
4	Diseases of Nutrition ..	..	..	1	..	1	..	..	1	..	..	..	..	·55	..	·15	..	..	·23	..	..
	Class V.																				
1	Accidents	5	4	1	4	4	1	5	..	1	3	2·59	1·14	·55	2·17	·59	·51	1·25	..	·25	·70
3	Homicide	..	..	..	..	1	..	..	..	..	..	..	..	..	..	·15	..	..	..	..	..
4	Suicide	..	1	3	1	3	..	1	..	1	..	..	·28	1·66	·54	·44	..	·25	..	·25	..
	Diseases not specified ..	1	1	..	..	..	..	..	..	..	..	·52	·28	..	..	..	..	..	..	..	..
	Total	74	65	30	220	171	34	269	108	505	40	38·42	18·58	16·58	119·18	25·35	17·32	67·06	24·63	127·75	9·39

The rate of mortality has been extremely high in the Lahore, Gwalior, and Meerut Divisions, chiefly from cholera; and it has also been high in the Presidency, Gwalior, and Meerut Divisions from dysentery and diarrhœa. In the Presidency Division these two diseases were most fatal at Barrackpore; in the Gwalior, at Morar; and in the Meerut, at Delhi. In the Peshawur Division, the mortality was under 1 per cent.; in the Benares, Saugor, and Rohilcund Divisions, under 2 per cent.; and, if cholera be deducted, it was under 2 per cent. also in the Oude Division. *Bengal.*

The information afforded by the quarterly returns respecting the outbreak of cholera is very defective, but this is of less consequence as a Special Board was appointed by the Governor-General to examine into all the circumstances connected with the epidemic, and it is probable that their Report, when completed, will be published by the Indian Government. In the meantime, the following information, gleaned from the quarterly returns and from the correspondence of the Inspector-General, Dr. Linton, C.B., may prove interesting.

During the first five months of the year, although several cases of cholera proved fatal at Calcutta and Dum Dum, the disease did not prevail as an epidemic. Towards the end of May it broke out in the 54th Regiment at Cawnpore, the first fatal case occurring on the 25th, and between that date and the 15th of June, twelve deaths were caused by it. The disease then appeared to cease.

In the beginning of July there was a fatal case in the 82nd Regiment at Delhi, and a few days later two in the 8th Hussars at Meerut. The disease then appeared in succession at Agra, where the first fatal case occurred on the 14th; at Allahabad, on the 18th; Morar, Gwalior, on the 24th; Cawnpore, on the 29th; Umballa, on the 30th; and Meean Meer, the European cantonment of Lahore, on the 7th of September. These are the dates of the first deaths reported, as the returns do not enable us to state those of the occurrence of the first cases if they recovered. The disease continued to prevail at some of the stations till the end of September. Dr. Linton reported that, during the epidemic, from its commencement at Cawnpore in May till its cessation in December, there were 1,303 admissions and 837 deaths among the men, showing a mortality of 10 in every 15·6 cases. The following return, forwarded by Dr. Linton, shows the admissions and deaths in each regiment, and we have added to it the strength of the corps as stated in the return for the week preceding that in which the first fatal case occurred.

Bengal.

Regiments, &c.	Strength.	Admitted into Hospital.	Died.	Ratio per 1000. Admitted.	Ratio per 1000. Died.	Stations.
R. H. Artillery, E. Troop ..	165	19	16	115·1	96·97	Meean Meer.
„ „ F. „ ..	172	3	3	17·4	17·44	Meerut.
Roy. Artillery, 11th Brig., 2nd Bat.	186	1	..	5·4	..	Lucknow.
„ „ „ 5th „	181	2	1	11 0	5·52	Meerut.
„ „ „ 6th „	189	1	1	5·3	5·29	Futtyghur.
„ „ 14th Brig., 4th Bat.	187	2	2	10·7	10·69	Allahabad.
7th Hussars	674	10	7	14·8	10·39	Umballa.
8th „	664	40	29	60·2	43·67	Meerut.
19th Regiment	586	2	2	3·4	3·41	Benares.
23rd „	1,088	2	1	1·8	·92	Lucknow.
27th „	967	197	143	203·7	147·88	Morar, Gwalior.
35th „	1,109	32	26	28·8	23·44	Meerut.
42nd „	916	64	43	69·9	46·94	Agra, detachment at Futtyghur.
51st „	818	397	209	485·3	255·5	Meean Meer.
52nd Detachment	270	8	7	29·6	25·93	Fort Gwalior.
54th Regiment	940	37	24	39·4	25·53	Cawnpore.
79th „	864	1	..	1·2	..	Ferozepore.
82nd „	1,059	81	39	76·5	36·83	Delhi.
88th Left Wing	465	2	2	4·3	4·30	Moradabad.
89th Regiment	875	61	45	69·7	51·43	Umballa.
90th „	951	29	19	30·5	19·93	Allahabad.
94th „	537	251	174	467·4	324·02	Meean Meer.
„ Left Wing	434	54	38	124·4	87·56	Umritsir.
Rifle Brigade, 3rd Battalion ..	989	6	5	6·1	5·06	Bareilly.

This shows that nearly one-third of the right wing of the 94th Regiment, and upwards of one-fourth of the 51st Regiment, both stationed at Meean Meer (Lahore), were cut off by this disease in the course of a few weeks. The 27th, at Morar, Gwalior, lost upwards of one-seventh of its numbers, and the mortality was also very high in the E Troop, Royal Horse Artillery, at Meean Meer, and the left wing of the 94th Regiment at Umritsir. This epidemic in one quarter caused upwards of half the deaths which occurred among the European troops during the whole of the year, and was so virulent that two out of every three cases terminated fatally.

At most of the stations, when the disease became epidemic, the troops were moved out of their cantonments and encamped. As the returns, however, do not enable us to trace correctly and minutely these changes, we have included the cases and deaths in each corps as having occurred at the station where it was quartered when attacked.

The sickness and mortality in each corps serving in Bengal during 1861 is shown in the following Table. The necessary correction to show the average *annual* strength has been made in those corps which were in the country during only a part of the year.

Corps.	Average Strength for the Year.	Admitted into Hospital.	Died.		Total Died.	Ratio per 1000 of Mean Strength.		Stations occupied by each Corps.
			In India.	Invalids on board Ship and at Home.		Admitted.	Died.	
Royal Artillery.								
E Troop, R.H.A.	171	339	17	..	17	1982	99·41	Meean Meer, 10 months on march, and Kurrachee, 2 months.
F Troop, ,, ...	173	315	7	..	7	1821	40·46	Meerut, 10½ months, on march and Raneegunge, 1½ months.
No. 1 Battery, 11 Brigade, R.A.	183	288	2	..	2	1574	10·93	Fyzabad .. .. Whole Year.
,, 2 ,, 11 ,, ,, ...	190	264	7	..	7	1389	36·84	Lucknow .. .. ,,
,, 3 ,, 11 ,, ,, ...	171	373	5	..	5	2181	29·24	Setapore .. .. ,,
,, 4 ,, 11 ,, ,, ...	161	366	3	..	3	2273	18·63	Mooltan .. .. ,,
,, 5 ,, 11 ,, ,, ...	178	469	7	..	7	2635	39·33	Meerut .. .. ,,
,, 6 ,, 11 ,, ,, ...	178	392	3	..	3	2202	16·85	Futtyghur .. .. ,,
,, 7 ,, 11 ,, ,, ...	184	588	..	..	..	3196	..	Peshawur .. .. ,,
,, 8 ,, 11 ,, ,, ...	176	422	5	..	5	2398	28·41	Bareilly .. .. ,,
,, 1 ,, 14 ,, ,, ...	182	297	3	..	3	1632	16·48	Barrackpore, 11 months, and on march, 1 month.
,, 2 ,, 14 ,, ,, ...	128	430	6	..	6	3359	46·87	Raj Ghat, Benares, 10½ mths., on march and Allahabad, 1½ mths.
,, 3 ,, 14 ,, ,, ...	18	35	3	..	3	1944	166·67	Darjeeling and Camps, 4½ months, Fort William, 1½ months.
,, 4 ,, 14 ,, ,, ...	185	242	6	..	6	1308	32·43	Allahabad, 11 months, and on march, 1 month.
,, 5 ,, 14 ,, ,, ...	172	307	9	..	9	1785	52·33	Dum-Dum, 10½ months, and on march, 1½ months.
,, 6 ,, 14 ,, ,, ...	191	151	3	..	3	791	15·71	Roy Bareilly .. .. .. Whole Year.
,, 7 ,, 14 ,, ,, ...	157	308	8	..	8	1962	50·95	Raneegunge .. .. .. ,,
R.A. (Battery and Brigade not specified) ..	..	..	4	9	13	..	..	
Total Royal Artillery	2,798	5,586	98	9	107	1996	38·24	

Corps.	Average Strength for the Year.	Admitted into Hospital.	Died.		Total Died.	Ratio per 1000 Mean Strength.		Stations occupied by each Corps.
			In India.	Invalids on board Ship & at Home.		Admitted.	Died.	
Cavalry.								
2nd Dragoon Guards	599	791	7	3	10	1320	16·69	Lucknow .. .. .. Whole year.
6th ,, ,, ...	79	71	1	3	4	899	50·63	Meerut, 1 month; march to embark, 1 month.
7th ,, ,, ...	616	980	6	..	6	1591	9·74	Sealkote .. .. Whole year.
7th Hussars ,, ...	685	1144	15	..	15	1670	21·90	Umballa .. .. ,,
8th ,, ,, ...	634	766	53	1	54	1208	85·17	On march, 1 month; Meerut, 11 months.
Total Cavalry	2613	3752	82	7	89	1436	34·06	
Infantry.								
5th Foot, 1st Battalion	150	169	4	..	4	1127	26·67	Calcutta, 2 months.
6th ,, ,, ...	730	1096	31	3	34	1501	46·57	Barrackpore, 3 months; Barrackpore and Senchall, 8 months; ditto, and on march, &c., 1 month.
7th ,, ,, ...	1009	2146	8	..	8	2127	7·93	Peshawur, 2 months; ditto and Fort Attock, 1½ months; Nowshera and Fort Attock, 6 months; ditto and Peshawur, 2½ months.
13th ,, ,, ...	958	970	20	1	21	1012	21·92	Goruckpore and Azimghur, 2 months; Gondah, 8¾ months; on march, 1½ months.
19th ,, ,, ...	763	1617	18	4	22	2119	28·83	Benares, 6 months; ditto and Senchall, 5 months; on march, 1 month.
20th ,, ,, ...	917	1496	15	..	15	1631	16·36	Gondah, 1½ months; Goruckpore, 10½ months.
23rd ,, ,, ...	1062	1398	18	1	19	1316	17·89	Lucknow, 11 months; Fyzabad, 1 month.
24th ,, ,, ...	136	84	1	3	4	618	29·41	Ferozepore, 1 month; march to embark, 2 months.
27th Foot	836	2567	187	1	188	3071	224·88	Morar .. .. Whole year.
34th ,, ...	907	1481	11	2	13	1633	14·33	Fyzabad, 11½ months; on march, &c., ½ month.
35th ,, ...	1055	2046	42	5	47	1939	44·55	Meerut, 10½ months; Agra, 1½ months.
37th ,, ...	111	109	1	1	2	982	18·02	Hazareebaugh, 1½ months; march to embark, ½ month.
38th ,, ...	961	1642	29	1	30	1709	31·22	Roy Bareilly, Allahabad, and on march, 3 months; Dinapore and Berhampore, 9 months.

42nd Foot	898	2312	65	1	66	2575	73·50	Bareilly, 2½ months; Agra and Futtyghur, 8½ months; on march and Futtyghur, 1 month.
43rd ,, ...	74	152	1	..	1	2054	13·51	Dum-Dum, 2 months.
46th ,, ...	1041	1035	10	..	10	994	9·61	Jullundur and Phillour, 11 months; on march, 1 month.
48th ,, ...	789	832	12	..	12	1054	15·21	Allahabad, &c., 1½ months; Setapore and Roy Bareilly, 9½ months; Lucknow and ditto, 1.
51st ,, ...	833	1635	237	1	238	1963	285·71	Meean Meer, 11 mths.; on march, and Rawul-Pindee, 1 mth.
52nd ,, ...	946	2831	32	2	34	2993	35·94	Jhansi, 1 month; ditto, Fort Gwalior and Lullutpore, 11 months.
54th ,, ...	909	1947	56	..	56	2142	61·61	Cawnpore, 10½ months; ditto, and on march, 1½ months.
70th ,, ...	48	71	4	3	7	1479	145·83	Allahabad, and march to embark, 1 month.
71st ,, ...	795	1686	11	3	14	2121	17·61	On march, 1½ months; Sealkote, 10½ months.
73rd ,, ...	114	220	4	..	4	1930	35·09	Dinapore and Berhampore, 2½ months; on march, ½ month.
75th ,, ...	844	2050	28	6	34	2429	40·28	Allahabad, 1 month; on march, 1 month; Calcutta, 10 months.
77th ,, ...	849	2144	15	2	17	2525	20·02	Hazareebaugh .. .. .. Whole year.
79th ,, ...	877	1467	7	2	9	1673	10·26	Meean Meer and Umritsir, 1 month; Ferozepore, 11 months.
80th ,, ...	921	2157	15	..	15	2342	16·29	Saugor and Nowgong .. .. Whole year.
81st ,, ...	954	1650	14	2	16	1730	16·77	Rawul-Pindee, whole year; detachmt. at Campbellpore, 6 mths.
82nd ,, ...	951	2180	99	1	100	2292	105·15	Moradabad, &c., 2 months; on march, ½ month; Delhi, 9½ months.
88th ,, ...	966	1530	23	..	23	1584	23·81	Delhi, 3 months; Shahjehanpore and Moradabad, 9 months.
89th ,, ...	850	2781	58	..	58	3272	68·23	Jhansi, Fort Gwalior, &c., ½ month; on march, 1½ months; Umballa, 9 months; Dugshai, 1 month.
90th ,, ...	922	2568	50	..	50	2785	54·23	Setapore, 1½ months; Allahabad, 10½ months.
92nd ,, ...	959	490	10	..	10	511	10·43	Umballa and Dugshai, 3 months; Dugshai, 7½ months; on march, 1½ months.
93rd ,, ...	1075	1290	7	..	7	1200	6·51	Rawul-Pindee, 9 months; ditto and Campbellpore, 1½ months; Peshawur, 1½ months.
94th ,, ...	840	1901	231	..	231	2263	275·00	Nowshera, &c., 2 months: on march, 1 month; Meean Meer and Umritsir, 9 months.
97th ,, ...	904	2366	24	2	26	2617	28·76	Jubbulpore .. .. .. Whole year.
98th ,, ...	941	2780	19	2	21	2954	22·32	Peshawur, 9 months; on march, ½ month; Rawul-Pindee and Fort Attock, 2½ months.
Rifle Brigade, 2nd Battalion	999	1401	25	..	25	1402	25·02	Umballa, 3 months; Subathoo, 9 months.
Ditto, 3rd ,, ...	980	1417	18	1	19	1446	19·39	Agra, 2 months; on march, ½ month; Bareilly, 9½ months.
Total Infantry	30,874	59,714	1460	50	1510	1934	48·91	

Bengal. The range in the proportion of admissions from the different corps was not so great as in 1860, varying from 3,196, in the Royal Artillery at Peshawur, to 511, in the 92nd Regiment at Dugshai. The extreme range of mortality, however, was much greater than in the preceding year, the Artillery at Peshawur having recorded no death, while the 51st Regiment at Meean Meer lost 238 men, or in the proportion of 286 per 1,000 of the mean strength. In the Regiments which served throughout the year in Bengal, the sickness was very high in the 7th Battery, 11th Brigade, Royal Artillery, at Peshawur; the 2nd Battery, 14th Brigade, at Raj Ghat, Benares; the 27th Regiment at Morar, Gwalior; and the 89th at Umballa. It was much below the average in the 6th Battery, 14th Brigade, Royal Artillery, at Roy Bareilly; the 46th Regiment at Jullundur and Phillour; and the 92nd at Dugshai. The mortality was greatly in excess in the 27th Regiment at Morar, the 51st at Meean Meer, the 82nd at Delhi, the 94th at Meean Meer and Umritsir, and the E Troop, Royal Horse Artillery, at Meean Meer. The proportion was also very high in some of the corps which were only part of the year in the country, as the 3rd Battery 14th Brigade Royal Artillery, and the 70th Regiment. On the other hand, the deaths in several did not exceed the average among troops at home or in healthy temperate climates, as in the 93rd Regiment at Rawul Pindee, the 7th at Nowshera and Peshawur, the 46th at Jullundur and Phillour, the 7th Hussars at Sealkote, the 79th Regiment at Ferozepore, the 92nd at Dugshai, and in the 1st Battery 11th Brigade Royal Artillery, and the 34th Regiment at Fyzabad. The 7th Battery 11th Brigade Royal Artillery at Peshawur, though having the highest ratio of admissions, did not return a single death.

II.—Madras.

Madras. The sickness and mortality during the year at each of the principal stations in this Presidency are shown in the following Table:—

		Lat. N.	Long. E.	Average Annual Strength.	Admitted into Hospital.	Died at each Station.	Annual Ratio per 1000. Admitted.	Annual Ratio per 1000. Died.	1860. Annual Ratio per 1000. Admitted.	1860. Annual Ratio per 1000. Died
Sea-coast..	Madras ..	13·6	80·21	936	1259	6	1345·1	6·41	2244	17·42
	Cannanore ..	11·51	72·56	1083	1045	10	964·9	9·23	1045	7·08
Table-lands	Bangalore ..	12·57	77·38	672	674	22	1003·0	32·73	818	14·15
	Bellary ..	15·5	76·55	858	1276	12	1487·2	13·98	1100	12·87
	Secunderabad	17·26	78·32	2970	4633	49	1559·9	16·49	1931	24·85
	Kamptee ..	21·15	79·14	1061	1427	13	1344·9	12·25	1660	31·69
Hill.. ..	Wellington..	..	..	960	513	19	534·4	19·78	774	20·74
Birmah ..	Rangoon ..	16·46	96·17	1101	1172	11	1064·5	9·99	1094	5·12
	Tongheo ..	19·	96·18	988	1273	9	1288·5	9·11	1692	16·43

It will be seen from this Table that there has been a decrease in the admissions into hospital at all the stations compared with the results of 1860, except Bangalore and Bellary, and in the deaths, except at Cannanore, Bangalore, Bellary, and Rangoon; and it is only at Bangalore that the increase has been considerable.

Adopting the division of the stations, as in last Report, into those on the Coast, the Table-lands, the Hills, and in Birmah, we find the prevalence and mortality of the different classes of diseases in each of the groups to have been as follows:—

Order.	Diseases.	Stations on Sea-coast.		On Table-lands.		Hill Station.		Birmah.		Stations on Sea-coast.		On Table-lands.		Hill Station.		Birmah.	
	Average Strength ..	2,019		5,561		960		2,089		Annual Ratio per 1000 of Strength.							
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1	Miasmatic Diseases ..	739	6	3,452	37	228	14	1,041	8	366·0	2·97	620·7	6·65	237·5	14·58	498·3	3·83
2	Enthetic „ ..	653	..	1,479	1	81	..	398	..	323·4	..	265·9	·18	84·4	..	190·5	..
3	Dietic „ ..	32	..	105	1	4	..	22	..	15·8	..	18·9	·18	4·2	..	10·5	..
4	Parasitic „ ..	22	..	39	..	3	..	24	..	10·9	..	7·0	..	3·1	..	11·5	..
1	Diathetic „ ..	13	..	16	3	2	..	2	..	6·4	..	2·9	·54	2·1	..	·9	..
2	Tubercular „ ..	24	1	88	5	4	..	44	2	11·9	·50	15·8	·90	4·2	..	21·1	·96
	Diseases of the—																
1	Nervous System ..	126	..	155	5	14	2	67	1	62·4	..	27·9	·90	14·6	2·08	32·1	·48
2	Circulatory „ ..	27	2	58	6	8	..	42	1	13·4	·98	10·4	1·08	8·4	..	20·1	·48
3	Respiratory „ ..	123	1	277	6	19	..	108	2	60·9	·50	49·8	1·08	19·8	..	51·7	·96
4	Digestive „ ..	145	1	844	22	73	2	248	3	71·8	·50	151·8	3·95	76·0	2·08	118·7	1·44
5	Urinary „ ..	4	1	10	2	3	..	8	..	2·0	·50	1·8	·36	3·1	..	3·8	..
6	Reproductive „ ..	4	..	127	..	9	..	47	..	2·0	..	22·8	..	9·4	..	22·5	..
7	Locomotive „ ..	8	..	26	..	..	..	7	..	4·0	..	4·7	..	..	..	3·4	..
8	Integumentary „ ..	232	..	653	..	33	..	244	..	114·9	..	117·4	..	34·4	..	116·8	..
4	Diseases of Nutrition..	7	..	27	1	1	..	7	..	3·5	..	4·8	·18	1·0	..	3·4	..
1	Accidents	136	4	544	6	30	..	134	3	67·3	1·96	97·8	1·08	31·2	..	64·1	1·44
4	Suicide	..	..	..	1	..	..	..	..	..	..	..	·18	..	..	..	..
6	Corporal Punishment ..	2	..	3	..	1	..	2	..	1·0	..	·5	..	1·0	..	·9	..
	Diseases not specified ..	7	..	107	..	..	1	..	..	3·5	..	19·2	..	..	1·04	..	..
	Total ..	2,304	16	8,010	96	513	19	2,445	20	1141·1	7·91	1440·1	17·26	534·4	19·78	1170·3	9·59
	Ratio per 1000 of Strength in 1860									1507·6	11·75	1634·3	23·16	773·9	20·74	1356·0	10·06

This Table shows a decrease in the admissions into hospital and deaths in all the groups of stations. On comparing the ratios of the different classes of disease with those of 1860, it will be found that the reduction in the admissions and, except at the Hill stations, in the deaths also, has been chiefly in miasmatic diseases.

Madras. MIASMATIC DISEASES.—On subdividing these as usual, we obtain the following results:—

	Stations on Sea-coast.		Stations on Table-lands.		Hill Station.		Birmah.		Stations on Sea-coast.		Stations on Table-lands.		Hill Station.		Birmah.	
Average Strength	2,019		5,561		960		2,039		Annual Ratio per 1000 of Strength.							
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	..	..	5	1	..	..	2	..	..	..	·9	·18	..	..	·9	..
Paroxysmal „	80	..	895	2	85	3	314	1	39·6	..	160·9	·36	88·5	3·12	150·3	·48
Continued „	182	1	901	5	5	..	137	2	90·1	·49	162·0	·90	5·2	..	65·6	·96
Dysentery and Diarrhœa	262	1	888	11	93	8	311	4	129·8	·49	159·7	1·98	96·9	8·33	148·9	1·92
Spasmodic Cholera	10	4	46	17	2	3	2	1	4·9	1·98	8·3	3·06	2·1	3·12	·9	·48
Tonsillitis and Influenza	24	..	106	..	7	..	13	..	11·9	..	19·1	..	7·3	..	6·2	..
Ophthalmia	35	..	160	..	4	..	115	..	17·3	..	28·8	..	4·2	..	55·1	..
Rheumatism	142	..	413	..	22	..	144	..	70·3	..	74·2	..	22·9	..	68·9	..

Paroxysmal Fevers have been less prevalent at all the groups of stations, but the reduction has been most marked at those on the sea coast, where the admissions have amounted to only one-tenth of the ratio in 1860. It has taken place almost exclusively at Fort St. George, in the 43rd Regiment, and has been due in a great measure to the men of that corps having got rid of the liability to malarious disease which they had contracted in their field service in Central India, and which was pointed out as the cause of the great excess of paroxysmal fevers in 1860 at Fort St. George. The higher ratio of deaths by this group of diseases at the Hill station arose from the occurrence of three deaths by remittent fever in the 3rd Battalion 60th Regiment. *Madras.*

Continued Fevers have prevailed to nearly the same extent as in 1860, except at the stations on the Table-lands where there has been a reduction to the extent of one-fifth.

Dysentery and *Diarrhœa* have undergone a reduction at stations on the Coast and Table-lands. At the Hill station their prevalence has been nearly the same, but the mortality by them has been thrice as high as in 1860. No reason is assigned by the medical officer in charge for this increased intensity of the disease.

Spasmodic Cholera was less fatal at all the groups of stations than in 1860. It prevailed, however, to a great extent in the 1st Dragoon Guards at Bangalore, and at one time threatened to assume an epidemic form in the 66th Regiment at Cannanore. The left wing of the 1st Dragoon Guards arrived from China at Madras early in January, and was sent up to Bangalore in four detachments. A case of cholera occurred in the second detachment when near Kistnagherry, about forty-five miles from Bangalore; another case occurred before, and two more immediately after its arrival at its destination on the 26th of January. Three cases of the disease occurred in the fourth detachment on the line of march. Notwithstanding the immediate adoption of every possible precaution the disease spread among the troops at Bangalore, and continued to prevail there till the 16th of April when it ceased. Including those already mentioned there were 36 cases among the men of the regiment, of which 16 terminated fatally. There were also two cases and one death among the officers; four cases and two deaths among the women; and two cases and one death among the children.

Cholera is stated to have been very prevalent in the district of Malabar from March to September, and in the 66th Regiment at Cannanore ten cases and four deaths occurred. An epidemic of great severity made its appearance at Madras in June among the native population, and continued its ravages till October. Dr. Barclay, the Surgeon of the 43rd Regiment, states that "two or three hundred persons perished from it weekly within the limits of the city for a considerable time, and the total number of deaths must have amounted to several thousands;" but not a single case occurred among the troops in Fort St. George.

Enthetic Diseases have given rise to a larger number of admissions than in 1860 at the stations on the Coast, the increase being chiefly in the 43rd Regiment at Fort St. George. At the Hill station the proportion of cases has been very low.

Diseases of the Digestive System.—Although this class of diseases shows a considerable reduction, the ratio of admissions at the stations on the table-lands and in Birmah continues very high. Inflammation of the liver, which was noticed in last Report as having been very prevalent in the 1st and 18th Regiments, has again been the cause of a large number of admissions, the former having had 146 and the latter 112 cases, both greatly in excess of the average of other corps.

The admissions and deaths, including those of invalids, which occurred in each corps serving in the Command, are shown in the following Table:—

	Annual Average Strength.	Admitted into Hospital.	Died.				Total Died.	Annual Ratio per 1000.		Station of each Corps.	
			In Hospital.	Out of Hospital.	Invalids on board Ship.	Invalids at Home.		Admitted.	Died.		
Royal Artillery	363	650	5	1	1	2	9	1790·7	24·79	Secunderabad*	Whole Year
CAVALRY.											
1st Dragoon Guards ..	672	674	21	1	..	..	22	1003·0	32·74	Bangalore	Whole Year
17th Lancers	628	1,180	11	..	..	..	11	1879·0	17·52	Secunderabad	„
Total Cavalry ..	1,300	1,854	32	1	..	..	33	1426·1	26·15		
INFANTRY.											
1st Battalion 1st Foot ..	987	1,282	10	1	2	..	13	1298·9	13·17	Secunderabad	Whole Year
1st „ 18th „ ..	992	1,521	19	2	1	1	23	1533·3	23·19	„	„
43rd Foot	936	1,259	5	1	1	..	7	1345·1	7·48	Fort St. George, Madras ..	„
3rd Battalion 60th Foot ..	960	513	16	3	2	..	21	534·4	21·88	Wellington..	„
66th Foot	1,083	1,045	8	2	1	..	11	964·9	10·16	Cannanore	„
68th „	1,101	1,172	11	..	..	..	11	1064·5	11·00	Rangoon	„
69th „	988	1,273	6	3	..	..	9	1288·5	9·11	Tonghoo	„
74th „	858	1,276	10	2	2	..	14	1487·2	16·32	Bellary	„
91st „	1,061	1,427	10	3	1	..	14	1344·9	13·19	Kamptee	„
Total Infantry ..	8,966	10,768	95	17	10	1	123	1201·0	13·72		

* In addition to these troops a Battery of the Royal Horse Artillery was stationed at Secunderabad till the 10th of June, when it marched to Masulipatam and embarked for England. The average strength while stationed at Secunderabad was 185, the admissions into hospital amounted to 148, and there was one death. These numbers give an *annual* ratio of 1,805 admissions and 12·20 deaths per 1,000 of strength. Four deaths by cholera occurred in it at Masulipatam previous to embarkation. We have omitted this Battery from the preceding Table, and from that showing the prevalence of disease at the stations on the table-lands, because, in consequence of defective returns, it has been found impossible to state separately the diseases which occurred among the men.

It will be seen that the ratio of admissions into hospital was highest in the 17th Lancers at Secunderabad, and lowest in the 3rd Battalion 60th Regiment, at Wellington. But the ratio was lower than in 1860 in all the corps, except the 74th at Bellary. The mortality also has been lower in most of the corps, the only notable exception being the 1st Dragoon Guards at Bangalore, in which a great increase was caused by the epidemic of cholera. *Madras.*

III. Bombay.

The following Table shows the sickness and mortality among Her Majesty's European troops in Bombay at each of the stations occupied in 1861 :— *Bombay.*

Military Division.	Station.	Average Strength for the Year.	Admitted into Hospital.	Died on the Station.	Ratio per 1000.	
					Admitted.	Died.
Presidency ..	Colaba	612	1862	39	3042·0	63·72
	Khandalla (General Depôt)	72	99	5	1375·0	69·44
Poona ..	Poona	1121	1618	23	1443·0	20·52
	Poorundhur (Sanitarium)	50	112	2	2240·0	40·00
	Sattara	156	252	2	1615·0	12·82
	Ahmednuggur ..	592	832	10	1405·0	16·89
	Asseerghur.. ..	91	162	2	1780·0	21·98
	Belgaum	926	1771	9	1912·0	9·72
Mhow ..	Mhow	1255	1836	26	1463·0	20·72
	Indore	82	96	1	1171·0	12·19
	Neemuch	216	748	7	3630·0	32·41
	Nusseerabad ..	1108	2319	48	2093·0	43·32
	Ajmere	61	128	..	2098·0	..
	Tarraghur	42	30	1	714·0	23·81
Northern ..	Deesa	713	1191	1	1670·0	1·40
	Ahmedabad ..	79	154	4	1949·0	50·63
	Surat	61	293	3	4803·0	49·18
	Mount Aboo (Sanitarium)	90	264	3	2933·0	33·33
Scinde ..	Kurrachee	667	778	10	1166·0	14·99
	Aden	576	687	5	1193·0	8·68
	On the march, &c...	290	708	3	2441·0	10·34

This Table shows a great range both in the sickness and mortality at the different stations. Omitting some of those at which, from the small number of men employed, a fair average could scarcely be looked for, the admissions will be found to vary from 1,166 at Kurrachee to 3,630 at Neemuch, and the deaths from 1·40 at Deesa to 63·72 at Colaba per 1,000 of mean strength. The latter ratio, however, is no doubt much increased by the invalids who have been sent to Colaba. The high proportion of sickness at Neemuch was caused by intermittent fever, which gave rise to nearly two-thirds of the admissions at that station.

Owing to defects in the returns we are unable to give the admissions in each of the military divisions by each class of diseases, but the following Table gives this information with regard to the fatal cases.

Order.	Military Divisions.	Deaths by each Class of Diseases.							Annual Ratio for 1,000 of Strength.						
		Presidency.	Poona.	Mhow.	Northern.	Scinde.	Aden.	On the March.	Presidency.	Poona.	Mhow.	Northern.	Scinde.	Aden.	On the March.
	Average Strength	684	2936	2764	943	667	576	290							
	Class I.														
1	Miasmatic Diseases—														
	Eruptive Fevers	..	..	4	..	..	..	..	..	..	1·45	..	..	..	..
	Paroxysmal „	5	7	2	2	1	..	..	7·31	2·39	·72	2·12	1·50	..	..
	Continued „	..	2	3	..	..	3	..	..	·68	1·08	..	..	5·21	..
	Dysentery and Diarrhœa	18	16	9	5	1	..	1	26·32	5·45	3·26	5·30	1·50	..	3·45
	Spasmodic Cholera ..	3	..	30	2	..	..	..	4·39	..	10·86	2·12	..	..	..
2	Enthetic Diseases	1	1	1	..	..	..	..	1·46	·34	·36	..	..	..	..
3	Dietic „	..	1	..	..	..	..	..	..	·34	..	..	..	..	..
	Class II.														
1	Diathetic Diseases	..	..	..	..	..	1	..	..	..	..	..	..	1·74	..
2	Tubercular „	4	..	2	1	3	1	..	5·85	..	·72	1·06	1·50	1·74	..
	Class III. Diseases of the—														
1	Nervous System	2	3	6	..	..	..	..	2·92	1·02	2·18	..	..	..	..
2	Circulatory „	..	2	2	..	..	..	..	..	·68	·72	..	..	..	..
3	Respiratory „	1	2	4	..	2	..	..	1·46	·68	1·45	..	3·00	..	..
4	Digestive „	6	8	15	1	3	..	..	8·77	2·73	5·43	1·06	4·50	..	..
5	Urinary „	1	..	..	..	..	..	1	1·46	..	..	..	..	..	3·45
	Class V.														
1	Accidents	3	6	3	..	..	..	1	4·39	2·04	1·08	..	..	..	3·45
4	Suicide „	..	..	1	..	..	..	..	..	..	·36	..	..	..	..
5	Execution	..	..	1	..	..	..	..	..	..	·36	..	..	..	..
	Total	44	48	83	11	10	5	3	64·33	16·35	30·03	11·66	15·00	8·69	10·35

Bombay.

An examination of this Table shows that in the Presidency and Mhow Divisions only has the mortality exceeded 16 per 1,000, or the rate which, till within the last few years, prevailed among the troops serving in the United Kingdom. The very high ratio in the Presidency Division was caused chiefly by dysentery and diarrhœa, hepatitis, and remittent fever at Colaba, and the high ratio in the Mhow Division by cholera at Nusseerabad. This disease became very prevalent and fatal among the native population of Ajmere early in July, but none of the men of a company of the 28th Regiment quartered in the Fort were attacked. On the 15th of July a case occurred in the head-quarters of the 28th at Nusseerabad, but recovered. About a fortnight afterwards cholera broke out with great severity in the 3rd Dragoon Guards at the same station, and on the 30th of July attacked the 28th Regiment. In these two corps it continued to prevail for some weeks, while a battery of Royal Artillery and the 1st Bombay Lancers escaped, and a Native Infantry Regiment in the same cantonment did not suffer till towards the end of the epidemic. No explanation has been given of this remarkable exemption enjoyed by the Artillery and Lancers, while the disease in a most virulent form prevailed in the other regiments in the same cantonment. It is also worthy of note that while at Ajmere the native population suffered severely and the troops completely escaped, the native population at Nusseerabad is stated to have been affected to a very slight extent, while the disease was so fatal to a portion of the garrison.

The sickness and mortality in the different corps serving in the Presidency are shown in the following Table :—

	Average Strength for the Year.	Admissions into Hospital.	Died.			Total Died.	Ratio per 1,000 of Mean Strength.		
			In Hospital.	Out of Hospital.	Of Invalids.		Admitted.	Died.	
D Battery, R. H. Artillery..	51	47	..	1	..	1	922	19·61	Mhow, 3 months.
1st Batt., 13th Brigd., R. A.	45	75	2	..	..	2	1,667	44·44	Poona, 3 months.
5th „ „ „	116	119	1	..	1	2	1,026	17·24	Aden, 9 months; Kurrachee, 3 months.
6th „ „ „	186	692	7	..	..	7	3,720	37·63	Neemuch, 12 months.
7th „ „ „	211	214	7	..	..	7	1,014	33·17	Poona, 12 months.
Total Artillery ..	609	1,147	17	1	*5	23	1,883	37·77	
3rd Dragoon Guards ..	646	1,213	26	2	2	30	1,878	46·44	Mhow, 11½ months; Left wing, Nusseerabad, 11½ months.
6th Dragoons	695	886	10	..	1	11	1,275	15·83	Ahmednugger, 10½ months; on march, 1 month; Mhow, ½ month.
Total Cavalry	1,341	2,099	36	2	3	41	1,565	30·57	
1st Battalion, 4th Foot ..	954	1,457	11	..	1	12	1,527	12·58	Ahmedabad, 1 month; Kurrachee, 10½ months; Right wing, Aden, 12 months.
28th Foot	986	2,048	35	1	1	37	2,077	37·52	Nusseerabad, 12 months; Detachment at Ajmere.
33rd „	990	1,514	4	..	..	4	1,529	4·04	Deesa, 10 months; March, 1 month; Bombay, 1 month.
56th „	938	2,743	45	3	3	51	2,924	54·37	Colaba, 11 months; March, 1 month; Detachment at Surat.
64th „	185	175	5	..	1	6	946	32·43	Kurrachee, 3 months.
72nd „	949	1,363	13	2	..	15	1,436	15·81	Mhow, 12 months.
83rd „	918	1,685	11	..	1	12	1,835	13·07	Belgaum, 12 months; Detachment at Rairee.
95th „	985	1,416	15	3	..	18	1,438	18·27	Poona.
Total Infantry ..	6,905	12,401	139	9	7	155	1,796	22·45	

* The Batteries to which four of these men belonged were not stated in the Returns.

This Table shows the sickness and mortality to have been highest in the Artillery, and the mortality to have been lowest in the Infantry. The highest ratio of deaths in any corps, however, was in the 56th Regiment quartered at Colaba with a detachment at Surat. Next to it in this respect were the 6th Battery, 13th Brigade, Royal Artillery, stationed at Neemuch, and the 28th Regiment at Nusseerabad. The mortality was lowest in the 33rd Regiment at Deesa, and next to it in the 4th Regiment, of which one wing was at Aden and the other at Kurrachee. *Bombay.*

The Artillery at Neemuch furnished the highest ratio of admissions into hospital, two-thirds of them being caused by intermittent fever. The lowest proportion of admissions was in the Royal Artillery, at Poona, and it was very nearly as low in the battery at Aden and Kurrachee; in the latter the mortality was only half as high as at Poona.

Section II.

On the extent of Invaliding.

The following summary of Abstract No. XXV. of Appendix, shows the number of men sent home for discharge from the service, and for change of climate from Madras and Bombay, with the classes of diseases which occasioned their being invalided. The same information cannot be given for the Bengal Presidency, in consequence of the annual returns not having been yet received. *India.*

Orders.		Madras. Recommended for Discharge from the Service.	Madras. Recommended for Change of Climate.	Bombay. Recommended for Discharge from the Service.	Bombay. Recommended for Change of Climate.
	Mean Strength	10,739		8,860	
	Class I.				
1	Miasmatic Diseases—				
	Ophthalmia	..	2	10	12
	Dysentery and Diarrhœa.. ..	1	32	3	30
	Paroxysmal Fevers	1	1	1	4
	Continued „	..	..	..	2
	Rheumatism	53	29	20	9
2	Enthetic Diseases	3	15	6	10
3	Dietic „	..	1	..	..
	Class II.				
1	Diathetic Diseases	..	1	..	..
2	Tubercular „	10	21	5	11
	Class III.				
	Diseases of the—				
1	Nervous system	12	15	20	11
2	Circulatory „	13	21	8	8
3	Respiratory „	3	14	4	9
4	Digestive „	4	67	15	33
5	Urinary „	..	1	..	..
6	Reproductive „	2	2	..	1
7	Locomotive „	3	3	3	3
8	Integumentary „	3	3	3	1
	Class IV.				
4	Diseases of Nutrition	1	6	4	6
	Class V.				
1	Accidents	4	1	3	..
	Worn out	30	4	..	..
	Total	143	239	105	150
	Ratio per 1,000 of mean strength ..	13·32	22·25	11·85	16·93

India. This Table shows rheumatism to have been the disease which gave rise to the largest number of men being sent home for discharge from the service, and diseases of the digestive system, with dysentery and diarrhœa, to have been the principal causes of invaliding for change of climate.

The number finally discharged the service as invalids during the year, is shown in the following Table.

	Exclusive of Royal Artillery.			Royal Artillery in India.	Total.
	Bengal.	Madras.	Bombay.		
Average Strength	34,685	10,266	8,251	3,880	57,082
Dysentery and Hepatic Disease ..	24	4	29	..	57
Rheumatism	33	41	57	3	134
Venereal	9	4	14	1	28
Weakly Constitution	2	9	12	..	23
Dropsy	1	..	3	..	4
Cachexies and Scrofula	16	4	8	2	30
Pulmonary disease	51	6	56	6	119
Mental diseases	30	4	17	..	51
Paralysis	2	3	10	4	19
Epilepsy	13	2	15	2	32
Deafness	10	..	8	1	19
Eye diseases	70	4	49	9	132
Cardiac and Aortic disease ..	30	6	33	12	81
Hernia	9	..	2	3	14
Stricture and Urinary diseases ..	3	1	4	..	8
Contractions	4	..	6	4	14
Ulcers and Varices	9	5	13	1	28
Dislocations	..	1	4	..	5
Fractures	..	..	..	3	3
Wounds	1	1	2	..	4
Loss and impaired use of, and diseases of Limbs	18	5	14	5	42
Worn out	5	1	4	..	10
Total	340	101	360	56	857
Ratio per 1,000 of mean strength 1861	9·80	9·84	43·65	14·43	15·01
Ratio per 1,000 of mean strength 1860	7·46	8·27	20·42	11·61	9·96

It will be observed that the number finally discharged the service was higher from all the Presidencies than in 1860. The increase, probably, has been to some extent due to advantage being taken of the reduction of the force in India, after the suppression of the Mutiny, to get rid of men who, from organic disease or health impaired by previous illness, were not likely to prove efficient soldiers. The excess from Bombay may probably have been owing also to some of the Regiments which were employed in China having returned to that Presidency.

The Table shows rheumatism and eye diseases to have been the two most frequent causes of permanent inefficiency. Pulmonary diseases, chiefly consumption, also hold a very high place, and next to these, heart affections, mental diseases, dysentery, and hepatic disease.

Section III.

Mean Daily Sick.

The average number constantly sick in the Bengal Presidency, as stated in the quarterly returns, was 3,009; in Madras, as given in the annual return.

619, and in Bombay 647. These numbers furnish the following results, to which, for the sake of comparison, we have annexed those of the preceding year :— *India.*

	Bengal.		Madras.		Bombay.	
	1861.	1860.	1861.	1860.	1861.	1860.
Ratio per 1,000 constantly sick ..	80·27	74·89	57·64	62·97	73·02	66·21
	Days.	Days.	Days.	Days.	Days.	Days.
Average sick time to each soldier ..	29·30	27·33	21·04	22·98	26·65	24·17
Average duration of cases	14·99	13·51	16·77	15·55	15·09	12·50

The general results as to the relative number constantly sick, and the duration of the cases in each of the Presidencies, correspond with those shown in last Report. There has, however, been an increase upon the results of 1860, except in the mean sick and average sick-time to each soldier in Madras, which have been slightly below the previous average. The duration of the cases, however, has been greater there, as well as in the other two Presidencies.

Section IV.

On the Influence of Age on the Mortality.

As the returns of the ages of the troops serving in the Bengal Presidency have not been received, the mortality by ages can be stated only for Madras and Bombay. In Abstracts Nos. XXVI. and XXVII. of Appendix, the numbers living, and the deaths at each age in the regiments serving in these two Presidencies, are stated, and the following Table shows the results :—

	Under 20 years.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Madras	728	4	4601	49	3288	51	1344	37	668	21	146	3
Bombay	702	6	3675	67	2632	61	1116	49	451	23	93	4
Total ..	1430	10	8276	116	5920	112	2460	86	1119	44	239	7
Ratio of deaths per 1000 of Strength	6·99		14·02		18·92		34·96		39·32		38·48	

These ratios show a very great increase in the mortality at 30 years of age and upwards, a result in accordance with the observations at almost all the tropical stations where British troops are employed.

XIII. ON THE HEALTH OF TROOPS ON BOARD SHIP.

Troops on Board Ship.

The circumstances under which troops are to be found on board ship may be advantageously grouped into classes :—

I. Regiments or drafts, proceeding from this country on foreign service.
II. Regiments returning home from foreign service.
III. Troops passing by sea on service from one colony to another, or from one station in a military command to another.
IV. Invalids returning to England for change of climate, or discharge from the service. With these may be classed men whose period of service has expired, and who are sent home for discharge.

The returns which have been received for the year 1861 show the sickness and mortality on board ship among 19,666 men in the first of these classes, 7,999 in the second, 4,968 in the third, and 4,271 in the fourth. As the length of time the different corps or detachments were on board ship varied greatly, according to the colonies to or from which they were proceeding, the limits having been five days from Gibraltar and 197 days from China, it becomes necessary, before making any calculations as to the amount of sickness and mortality, to reduce the strength to the average *annual* strength. This has accordingly been done by multiplying the number of men embarked in each vessel by the number of days they were on board, and dividing this by 365; the product is the mean *annual* strength. As the length of the voyage, and the nature of the climate to or from which the troops were proceeding, may naturally be expected to exert an influence on the health of the men, we have further grouped the returns together into five great divisions :— 1. India and China, including Ceylon and the Mauritius; 2. Cape of Good Hope; 3. Australia; 4. Mediterranean; 5. British America.

I. Troops proceeding on Foreign Service.

The number embarked for foreign service during the year was 19,666. The following Table shows the number of cases of sickness and the deaths which occurred among them during the voyage, with the classes of diseases by which these were occasioned. The diseases by which the admissions and deaths were caused are detailed in Abstract No. XXVIII of Appendix.

Stations	To India and China.				To Cape of Good Hope.				To Mediterranean.				To Australian Colonies.				To British America.			
No. of men Embarked ..	2,498				1,484				2,795				1,082				11,807			
Average *Annual* Strength	755				292				91				294				623			
			Ratio per 1000.				Ratio per 1000.				Ratio per 1000.				Ratio per 1000.				Ratio per 1000.	
Order.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Class I.																				
1 Miasmatic diseases ..	109	2	144·4	2·65	99	..	339·1	..	11	..	120·9	..	47	..	159·9	..	106	..	170·2	..
2 Enthetic „ ..	70	..	92·7	..	115	..	393·8	..	12	..	131·8	..	46	..	156·5	..	159	..	255·2	..
3 Dietic „ ..	3	..	4·0	..	2	..	6·9	..	..	..	..	..	..	..	..	..	..	..	..	..
4 Parasitic „ ..	3	..	4·0	..	19	..	65·1	..	..	..	..	..	12	..	40·8	..	1	..	1·6	..
Class II.																				
1 Diathetic diseases ..	2	..	2·6	..	1	..	3·4	..	..	..	..	..	1	..	3·4	..	..	..	..	..
2 Tubercular „ ..	5	..	6·6	..	2	..	6·9	..	..	..	..	..	2	..	6·8	..	2	..	3·2	..
Class III. Diseases of the—																				
1 Nervous system ..	13	..	17·2	..	2	..	6·9	..	..	..	..	..	9	..	30·6	..	21	1	33·7	1·60
2 Circulatory „ ..	..	..	..	..	..	1	..	3·42	..	1	..	10·99	..	..	..	..	7	..	11·2	..
3 Respiratory „ ..	23	1	30·5	1·33	6	..	20·5	..	2	..	22·0	..	10	..	34·0	..	41	..	65·8	..
4 Digestive „ ..	32	1	42·4	1·33	26	..	89·0	..	3	..	33·0	..	10	..	34·0	..	38	..	61·0	..
5 Urinary „ ..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	6·8	..	..	..	..	..
6 Reproductive „ ..	2	..	2·6	..	..	..	..	..	..	..	..	..	3	..	10·2	..	..	..	..	..
7 Locomotive „ ..	1	..	1·3	..	1	..	3·4	..	..	..	..	..	3	..	10·2	..	..	..	..	..
8 Integumentary „ ..	52	..	68·9	..	50	..	171·2	..	9	..	98·9	..	30	..	102·0	..	50	..	80·3	..
Class IV.																				
4 Diseases of Nutrition	4	..	5·3	..	..	..	..	..	..	..	..	..	2	..	6·8	..	2	..	3·2	..
Class V.																				
1 Accidents	44	2	58·3	2·65	26	..	89·0	..	9	..	98·9	..	21	..	71·4	..	42	..	67·4	..
4 Suicide	1	1	1·3	1·33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6 Corporal Punishment	3	..	4·0	..	..	..	..	..	..	..	..	..	1	..	3·4	..	..	..	..	..
Total ..	367	7	486·1	9·29	349	1	1195·2	3·42	46	1	505·5	10·99	199	..	676·8	..	469	1	752·8	1·60

Troops on Board Ship.

Troops on Board Ship.

These results show a satisfactory state of health as regards all the troops except those proceeding to the Cape. The high ratio of sickness among the latter was due to the prevalence of sorethroat and influenza, venereal, itch, and boils, in the 2nd Battalion 11th Regiment, on board the ships "Boanerges" and "Indomitable," and which were stated by the medical officers to be the result of their excesses in Portsmouth, where they were embarked. It is stated in the report of the medical officer who went out in charge of the "Boanerges," that thirty-six hours previous to embarkation 25 per cent. of the men were absent from barracks.

The proportion of deaths among the men proceeding to India and China is relatively high, but two of them were by drowning, one accidental, the other suicidal, and one was by sunstroke. The two deaths from dysentery occurred on board the "Strathallan," towards the close of a very long voyage to Hong Kong, during the last six weeks of which the weather was very bad, constant heavy rains with calms, and the thermometer ranging from 85° to 90° Fahr. in the shade. The duration of the voyage was 160 days.

II. Troops Returning from Foreign Service.

The total number embarked, as shown by the returns, was 7,999. The following Table gives the information respecting the sickness and mortality among them. For diseases and causes of death see Abstract No. XXIX. of Appendix.

Stations		From India and China.				From Cape of Good Hope.				From Mediterranean.			
Number of Men Embarked		5,942				930				1,127			
Average *Annual* Strength		2,194				135				23			
Order.	Diseases.	Admitted.	Died.	Ratio per 1000. Admitted.	Ratio per 1000. Died.	Admitted.	Died.	Ratio per 1000. Admitted.	Ratio per 1000. Died.	Admitted.	Died.	Ratio per 1000. Admitted.	Ratio per 1000. Died.
	Class I.												
1	Miasmatic Diseases ..	920	37	419·3	16·86	139	..	1029·7	..	4	..	173·9	..
2	Enthetic „ ..	216	..	98·4	..	14	..	103·7	..	1	..	43·5	..
3	Dietic .. „ ..	14	1	6·4	·45	..	..	..	..	..	..	..	..
4	Parasitic „ ..	3	..	1·4	..	..	..	..	..	..	..	..	..
	Class II.												
1	Diathetic Diseases ..	1	..	·4	..	..	..	..	..	..	..	..	..
2	Tubercular „ ..	11	4	5·0	1·83	..	1	..	7·41	..	..	..	..
	Class III. Diseases of the—												
1	Nervous System	29	4	13·2	1·83	2	..	14·8	..	..	..	..	..
2	Circulatory „	2	..	·9	..	1	..	7·4	..	..	..	..	..
3	Respiratory „	72	2	32·8	·91	5	..	37·0	..	4	..	173·9	..
4	Digestive „	114	4	52·0	1·83	14	..	103·7	..	..	..	..	..
5	Urinary „	5	..	2·3	..	..	..	..	..	..	..	..	..
6	Reproductive „	12	..	5·5	..	1	..	7·4	..	..	..	..	..
7	Locomotive „	5	..	2·3	..	..	..	..	..	..	..	..	..
8	Integumentary „	159	1	72·5	·45	13	..	96·3	..	..	..	..	..
	Class IV.												
4	Diseases of Nutrition .	2	..	·9	..	..	..	..	..	..	..	..	..
	Class V.												
1	Accidents	114	2	52·0	·91	7	..	51·9	..	..	..	..	..
6	Corporal Punishment	2	..	·9	..	..	..	..	..	..	..	..	..
	Diseases not specified	6	..	2·7	..	..	..	..	..	..	..	..	..
	Total	1687	55	768·9	25·07	196	1	1451·9	7·41	9	..	391·3	..

As might have been anticipated, the ratio of deaths among the troops returning from India and China is high, but that of the cases of sickness has been moderate; more than half of it, however, has been caused by miasmatic diseases, chiefly diarrhœa, dysentery, intermittent fever, and ophthalmia. Twenty of the deaths were caused by dysentery and diarrhœa, and fourteen by cholera. The cases of sickness among the troops from the Cape were very numerous, but this arose from the prevalence of opthalmia in a detachment of the 3rd Regiment * on board the "Sir William Peel." Between the 9th of March and the 26th of April, 101 cases occurred among 300 men. The Medical Officer in charge states that the disease was contracted while the men were exposed to the drifting sands after the wreck of the "Miles Barton," on Klep Strand. *Troops on Board Ship.*

III. Troops Proceeding from one Colony to Another.

The only important movements of this nature were from China to the Mauritius, and to India, and from India to New Zealand. There was also the change of the 1st Battalion 14th Regiment from Corfu to Jamaica, and several moves of troops from one station to another in the West Indies, Australian Colonies, and at the Cape. The total number of men embarked was 4,968, and the following Table shows the sickness and mortality which occurred among them. For diseases and causes of death see Abstract No. XXX. of Appendix.

Order.	Diseases.	China to India and Mauritius.				India to New Zealand.				Other intermediate Changes.			
	Stations												
	No. of Men embarked..	1302				1000				2666			
	Average *Annual* Strngth.	223				213				135			
		Admitted.	Died.	Ratio per 1000. Admitted.	Ratio per 1000. Died.	Admitted.	Died.	Ratio per 1000. Admitted.	Ratio per 1000. Died.	Admitted.	Died.	Ratio per 1000. Admitted.	Ratio per 1000. Died.
	Class I.												
1	Miasmatic Diseases	249	1	1116·6	4·49	89	27	417·8	126·76	22	1	163·0	7·41
2	Enthetic „ ..	50	..	224·2	..	31	..	145·5	..	25	..	185·2	..
3	Dietic „ ..	2	..	9·0	..	..	..	..	..	1	..	7·4	..
4	Parasitic „ ..	..	..	..	..	1	..	4·7	..	..	..	..	..
	Class II.												
1	Diathetic Diseases..	1	1	4·5	4·49	..	..	..	..	1	..	7·4	..
2	Tubercular „ ..	2	..	9·0	..	3	..	14·0	..	..	..	..	..
	Class III. Diseases of the—												
1	Nervous system..	..	..	..	..	7	..	32·9	..	..	..	..	..
3	Respiratory „	21	..	94·2	..	24	1	112·7	4·69	11	..	81·5	..
4	Digestive „	10	1	44·8	4·49	7	..	32·9	..	4	..	29·6	..
6	Reproductive „	4	..	17·9	..	1	..	4·7	..	..	..	..	..
7	Locomotive „	1	..	4·5	..	..	..	..	..	..	..	..	..
8	Integumentary „	31	..	139·0	..	12	..	56·3	..	11	..	81·5	..
	Class IV.												
4	Diseases of Nutrition	3	..	13·5	..	4	..	18·8	..	..	..	..	..
	Class V.												
1	Accidents	10	..	44·8	..	7	..	32·9	..	9	..	66·6	..
	Total ..	384	3	1722·0	13·47	186	28	873·2	131·45	84	1	622·2	7·41

* The detachment of the 3rd Regiment here referred to was wrecked at the Cape of Good Hope, on its voyage home from China. As all the documents were lost, and there are no returns of the sickness and mortality during the voyage from China to the Cape, it has been deemed advisable to include this detachment among the troops returning from the Cape, and the more so as the only very prevalent disease among the men is supposed to have been excited by their exposure after the wreck.

Troops on Board Ship.

The ratio of sickness among the troops passing from China to India and the Mauritius was high. This was owing to the prevalence of continued fever and ophthalmia in the head-quarters of the 44th Regiment on board the "Minerva," from Hong Kong to Belgaum. Of the former disease 106, and of the latter 40 cases occurred among 292 men, between the 12th of October and 23rd of December. They were for the most part slight, and seldom more than two or three days under treatment.

The mortality among the troops proceeding from India to New Zealand was very great, from cholera having broken out in the 70th Regiment immediately after embarkation at Calcutta. Twenty-three men of the corps died by this disease on the voyage, and also two by diarrhœa, and two by dysentery.

IV. Invalids, &c., returning to England.

The number of these, included in the returns, was 4,271, and the deaths among them were 93. As these deaths, however, have all been accounted for in the preceding part of this Report, it appears unnecessary here to enter into any details respecting them.

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APPENDIX No. 1.

ABSTRACT showing the Admissions into Hospital and Deaths among the Troops serving in the United Kingdom in the year 1861.

	Household Cavalry.		Cavalry.		Royal Artillery.		Military Train.		Foot Guards.		Infantry.		Cavalry Depôts.		Roy. Art. Depôt Brigade.		Infantry Depôt Battalions.	
Strength	1,219		9,528		10,021		1,817		5,811		26,719		1,101		3,314		21,970	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*																		
1. Miasmatic:																		
Variola	..	..	3	2	10	1	..	..	1	..	19	1	..	..	..	..	3	..
Varioloides	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Varicella	..	..	..	..	2	..	1	..	3	..	5	..	..	..	..	..	8	..
Morbilli	..	..	8	..	9	..	..	..	7	..	38	..	3	..	10	..	31	1
Scarlatina	..	..	2	..	3	1	..	..	10	1	20	1	..	..	..	..	17	..
Diphtheria	..	..	..	..	..	..	..	..	1	..	1	..	..	..	1	..	2	..
Parotitis	..	..	3	..	3	..	..	..	2	..	15	..	..	..	..	..	14	..
Tonsillitis	37	..	297	1	317	..	28	..	166	..	633	..	52	..	255	..	978	1
Influenza	..	..	333	..	101	..	30	..	95	1	404	..	39	..	6	..	423	..
Ophthalmia	1	..	110	..	174	..	20	..	62	..	763	..	48	..	65	..	891	..
Erysipelas	..	..	17	..	27	..	4	..	13	..	52	1	2	..	3	..	45	2
Furunculus	13	..	212	..	102	..	12	..	24	..	283	..	22	..	63	..	141	..
Dysenteria Acuta	..	..	5	..	9	..	..	..	..	..	13	..	1	..	8	..	31	..
„ Chronica	..	..	10	..	4	..	..	..	..	..	9	..	5	..	21	..	46	2
Diarrhœa	32	..	240	..	213	..	20	1	122	1	360	1	51	..	80	..	378	..
Cholera Biliosa	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	2
„ Spasmodica	..	..	1	..	..	..	..	..	..	..	2	1	..	..	..	..	..	..
Febris Intermittens	1	..	34	..	53	..	..	..	7	..	112	..	9	..	60	..	216	1
„ Remittens	..	..	..	..	8	..	..	..	..	..	13	..	2	..	2	..	4	..
„ Typhoides	..	..	1	1	3	1	..	..	1	1	13	5	1	..	..	..	5	2

Febris Typhus	..	..	..	..	..	..	..	..	..	..	..	1	..	4	1	..	..	..	..	8	4
„ Continua	..	..	..	7	..	257	4	121	4	37	1	171	2	497	10	39	..	62	1	545	8
Anthrax	.	..	..	..	..	13	..	11	..	..	..	3	..	10	..	..	..	..	..	4	..
Rheumatismus Acutus	..	..	39	..	386	..	257	..	87	..	150	..	732	..	62	..	143	1	546	2
„ Chronicus	..	..	15	..	152	..	248	..	40	..	95	..	591	2	39	..	112	..	555	..
Vaccinia	..	..	..	..	..	..	1	..	3	..	..	..	..	3	..	1	..	1	..	21	..
Pertussis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	48	..
2. Enthetic:																					
Syphilis Primaria	..	..	..	65	..	1,258	..	1,658	..	236	..	877	..	3,166	..	131	..	482	..	1,839	..
„ Secundaria	..	..	8	..	404	..	386	..	117	..	242	..	719	2	38	1	177	2	457	2
Cachexia Syphiloidæa	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..
Iritis Syphilitica	..	..	..	..	8	..	17	..	8	..	11	..	37	..	2	..	14	..	17	..
Bubo	..	..	..	21	..	343	..	442	..	65	..	158	..	932	..	23	..	92	..	623	..
Gonorrhœa	..	..	..	54	..	966	..	1,487	..	192	..	280	..	2,885	..	158	..	616	..	2,462	..
Phymosis, &c.	..	..	..	2	..	9	..	13	..	7	..	14	..	32	..	4	..	9	..	47	..
Orchitis (Gonorrhœal)	..	..	20	..	149	..	97	..	25	..	87	..	242	..	3	..	36	..	257	..
Strictura Urethræ	..	..	..	1	..	37	1	22	..	3	..	20	..	74	1	1	..	13	..	82	..
Verrucæ	..	..	..	..	..	16	..	22	..	1	..	12	..	62	..	17	..	11	..	25	..
Ulcus Penis	..	..	..	..	..	2	..	..	..	47	..	19	..	16	..	..	..	..	..	14	..
Ophthalmia (Gonorrhœal)		..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Nodus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
3. Dietic:																					
Scorbutus	..	..	..	..	..	4	..	..	..	..	..	..	..	9	..	..	..	1	..	6	..
Purpura	..	..	..	..	..	2	..	1	..	1	..	..	..	9	1	..	..	..	..	2	..
Ebriositas	..	..	..	3	..	44	..	42	..	7	..	25	..	123	..	6	..	14	..	142	..
Bronchocele	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	1	..
4. Parasitic:																					
Porrigo	..	..	..	..	..	7	..	30	..	1	..	5	..	46	..	2	..	..	..	83	..
Scabies	..	..	..	10	..	148	..	234	..	42	..	187	..	643	..	9	..	224	..	812	..
Tænia Solium	..	..	..	..	..	7	..	11	..	..	..	2	..	5	..	2	..	3	..	19	..
Ascaris Lumbricoides	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..
Dracunculus	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..
Vermes	..	..	..	..	..	..	..	2	..	..	..	1	..	7	..	..	..	2	..	6	..
Aphthæ	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Phthiriasis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..

Appendix No. I.—*continued.*

Diseases.	Household Cavalry.		Cavalry.		Royal Artillery.		Military Train.		Guards.		Infantry.		Cavalry Depôts.		Roy. Art. Depôt Brigade.		Infantry Depôt Battalions.	
Strength	1,219		9,528		10,021		1,817		5,811		26,719		1,101		3,314		21,970	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
II. *Constitutional Diseases.*																		
1. Diathetic:																		
Podagra	5	..	1	..	4	..	..	..	1	..	2	..	..	..	..	..	1	..
Lumbago	..	..	4	..	16	..	9	..	4	..	6	..	..	..	..	..	5	..
Anæmia	..	..	..	..	4	..	..	..	..	..	16	..	..	..	..	..	6	..
Anasarca	..	..	8	2	3	..	..	..	4	..	6	1	3	..	..	..	15	3
Scirrhoma	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Carcinoma	..	..	..	..	..	..	..	..	2	1	1	2	..	..	..	..	1	1
Tumores	..	..	5	..	6	..	..	..	3	..	27	1	..	..	3	..	7	..
Cachexia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Lupus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
2. Tubercular:																		
Scrofula	..	..	43	..	75	..	10	1	19	..	132	..	5	..	28	..	101	..
Apostema Lumbare	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	1	1
Abscessus Psoanus.. ..	..	..	1	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
Morbus Coxarius	..	..	..	..	2	..	..	..	..	..	..	..	..	..	1	1	..	1
Phthisis Pulmonalis	5	5	63	23	72	24	21	3	88	13	186	67	11	4	90	18	277	109
Hæmoptysis	4	..	18	..	29	..	5	..	27	1	75	5	2	..	21	..	66	4
Tabes Mesenterica	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..
III. *Local Diseases.*																		
1. Nervous System:																		
Meningitis	..	..	1	..	1	1	..	..	4	4	2	3	1	..	..	..	3	2
Encephalitis	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	2

| | | |

Appendix No. I.—*continued.*

Diseases.	Household Cavalry.		Cavalry.		Royal Artillery.		Military Train.		Foot Guards.		Infantry.		Cavalry Depôts.		Roy. Art. Depôt Brigade.		Infantry Depôt Battalions.	
Strength	1,219		9,528		10,021		1,817		5,811		26,719		1,101		3,314		21,970	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Palpitatio Cordis	..	..	5	..	..	..	2	..	..	..	2	..	..	..	..	..	12	..
Phlebitis	..	..	..	..	1	..	..	..	..	..	3	..	..	..	..	..	..	..
Angina Pectoris	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
3. Respiratory System:																		
Laryngitis	1	..	7	..	16	..	..	..	4	1	5	..	1	1	3	..	7	..
Œdema Glottidis	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
Bronchitis Acuta	66	..	429	8	466	5	75	1	331	..	1,762	8	98	..	350	2	1,745	1
„ Chronica	2	..	53	1	96	2	20	..	36	1	348	9	29	..	79	..	574	7
Pleuritis	3	..	38	..	53	..	6	..	28	3	69	2	20	..	8	..	116	3
Empyema	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1
Hydrothorax	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	1	..
Pneumonia	1	1	34	2	43	7	7	2	20	3	120	12	6	..	12	2	116	16
Apoplexia Pulmonalis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Asthma	2	2	3	..	3	..	1	..	2	..	24	..	1	..	10	..	32	1
Epistaxis	..	..	1	..	2	..	..	..	1	..	7	..	..	..	..	..	3	..
Emphysema	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..
4. Digestive System:																		
Pharyngitis	..	..	2	..	1	..	1	..	..	..	3	..	7	..	..	..	..	..
Stomatitis	..	..	..	..	..	..	..	..	2	..	4	..	2	..	1	..	1	..
Glossitis	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..
Gastritis	1	..	4	..	1	..	..	..	..	..	5	2	..	..	3	..	10	2
Enteritis	..	..	2	..	1	..	..	..	..	..	9	2	..	..	1	..	2	..

Peritonitis	..	..	..	..	..	..	2	..	..	..	1	..	1	..	4	2	..	..	2	..	5	3
Obstipatio	..	..	..	..	..	..	4	..	4	..	1	..	2	..	47	..	..	..	4	..	39	..
Dyspepsia	..	..	..	..	38	..	98	..	110	..	29	..	84	..	382	1	32	..	66	..	234	..
Colica	..	..	..	..	5	..	31	..	44	1	7	..	34	..	82	..	5	..	14	..	89	..
Hæmatemesis	..	..	..	..	..	..	..	..	2	..	..	..	..	..	2	..	1	..	1	..	4	..
Hernia Inguinalis	..	..	..	1	..	11	..	18	..	2	..	7	..	28	..	2	..	21	..	57	..	..
„ Femoralis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	2	..	..
Hæmorrhois	..	..	..	1	..	51	..	57	..	4	..	10	..	153	..	5	..	19	..	119	..	..
Prolapsus Ani	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	8	..	..
Fistula in Ano	..	..	..	2	..	4	..	8	..	..	..	1	..	14	..	2	..	4	..	23	..	..
Splenitis	..	..	..	..	..	4	..	4	..	..	..	..	..	15	..	..	..	1	..	9	..	..
Hepatitis Acuta	..	..	..	..	..	13	1	6	1	4	..	4	..	24	3	1	..	4	..	24	1	..
„ Chronica	..	..	..	..	..	22	..	10	..	1	..	..	..	70	1	18	1	17	..	184	4	..
Icterus	..	..	..	2	..	21	..	27	..	4	..	26	..	97	1	5	..	10	..	74	..	..
Ascites	..	..	..	..	..	2	..	1	..	1	..	1	1	10	..	1	..	..	..	14	..	..
5. Urinary System:																						
Nephritis	..	..	..	..	..	3	..	..	..	2	..	..	..	10	..	2	..	..	..	8	2	..
Nephria	..	..	..	..	..	1	..	..	..	..	..	1	1	5	1	1	..	2	..	4	1	..
Ischuria	..	..	..	2	..	3	..	1	..	..	..	..	..	6	..	..	..	..	..	2	..	..
Diuresis	..	..	..	1	..	2	..	..	..	..	..	..	..	3	..	..	..	..	..	3	..	..
Hæmaturia	..	..	..	..	..	..	..	2	..	1	..	2	..	4	..	..	..	3	..	2	..	..
Lithiasis	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	2	..	..
Calculus Urethra	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..
Cystitis	..	..	..	..	..	1	..	..	..	..	..	..	..	6	..	..	..	1	..	..	..	..
Fistula in Perineo	..	..	..	..	..	1	..	..	..	..	..	..	..	3	..	1	..	1	..	4	..	..
Enuresis	..	..	..	..	..	5	..	3	..	..	..	1	..	36	..	3	..	6	..	46	1	..
Diabetes	..	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..	..	..	..	2	1	..
Morbus Prostaticus	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..
III. *Local Diseases.*																						
6. Reproductive System:																						
Varicocele	..	..	..	..	1	..	4	..	3	..	..	..	5	..	11	..	1	..	1	..	9	..
Hydrocele	..	..	..	..	1	..	5	..	10	..	..	..	4	..	21	..	..	..	4	..	20	..
Orchitis (not Gonorrhœal)			..	4	..	96	..	121	..	25	..	6	..	187	..	21	..	27	..	45	..	..
Spermatorrhœa	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..

Appendix No. 1.—*continued.*

Diseases.	Household Cavalry.		Cavalry.		Royal Artillery.		Military Train.		Foot Guards.		Infantry.		Cavalry Depôts.		Roy. Art. Depôt Brigade.		Infantry Depôt Battalions.	
Strength	1,219		9,528		10,021		1,817		5,811		26,719		1,101		3,314		21,970	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
7. Locomotive System:																		
Arthritis	..	..	5	..	..	..	..	..	1	..	18	..	1	..	2	..	13	..
Synovitis	..	..	5	..	12	..	..	..	4	..	23	..	..	..	7	..	26	..
Contractura	..	..	..	..	7	..	..	..	..	..	7	..	..	..	6	..	5	..
Periostitis	..	..	13	..	9	..	..	..	4	..	20	..	..	..	3	..	26	..
Exostosis	..	..	..	..	2	..	1	..	..	..	1	..	..	..	1	..	..	..
Caries	..	..	2	..	7	..	..	..	1	..	5	..	..	..	3	..	2	1
Necrosis	..	..	4	..	2	..	..	..	2	..	3	..	..	..	2	..	2	..
Atrophia musculorum	..	..	1	..	4	..	..	..	1	..	6	..	..	..	..	..	4	..
Hydrarthrus	..	..	1	..	..	..	..	..	..	..	5	..	..	..	..	..	2	..
Deformitas	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
8. Integumentary System:																		
Urticaria	..	..	10	..	7	..	..	..	3	..	10	..	..	..	7	..	6	..
Eczema	..	..	4	..	35	..	2	..	13	..	118	..	12	..	17	..	66	..
Herpes	..	..	3	..	13	..	1	..	10	..	64	..	1	..	13	..	44	..
Impetigo	..	..	3	..	9	..	3	..	3	..	7	..	1	..	..	..	36	..
Psoriasis	..	..	23	..	22	..	4	..	6	..	73	..	3	..	15	..	64	..
Lichen	..	..	..	..	..	..	..	..	..	..	4	..	..	..	2	..	1	..
Pityriasis	..	..	2	..	..	..	..	..	..	..	1	..	2	..	1	..	2	..
Pernio	..	..	2	..	2	..	..	..	..	..	1	..	1	..	..	..	..	..
Pemphigus	..	..	1	..	7	..	..	..	..	..	1	..	1	..	..	..	1	..
Acne	..	..	4	..	1	..	1	..	8	..	6	..	..	..	1	..	3	..
Morbus Cutis	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Clavus	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Icthyosis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Roseola	..	..	..	..	..	..	2	..	..	..	..	..	..	..	1	..	..	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..
Tinea Favosa	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lepra	..	..	..	..	..	..	1	..	3	..	2	..	..	..	13	..	..	..	2	..	9	..	..	..	..	..	..	..	..	..	..	..
Rupia	..	..	..	..	..	..	3	..	4	..	1	..	..	..	1	..	..	..	..	..	8	..	..	..	..	..	..	..	..	..	..	..
Ecthyma	..	..	..	..	..	..	..	..	2	..	..	..	1	..	5	..	..	..	5	..	1	..	..	..	..	..	..	..	..	..	..	..
Prurigo	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Mentagra	..	..	..	..	..	..	..	..	..	..	..	..	1	..	4	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Sycosis Menti	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Phlegmon	..	..	..	..	54	..	636	..	427	..	90	..	195	..	1,237	..	111	..	139	..	1,288	..	..	..	..	..	..	..	..	..	..	..
Abscessus	..	..	..	..	37	..	159	..	187	..	23	..	147	..	285	..	22	..	85	2	157	2	..	..	..	..	..	..	..	..	..	..
Paronychia	..	..	..	..	3	..	72	..	73	..	10	..	4	..	101	..	29	..	18	..	54	..	..	..	..	..	..	..	..	..	..	..
Ulcus	..	..	..	..	11	..	424	..	425	..	42	..	114	..	665	..	45	..	166	..	662	..	..	..	..	..	..	..	..	..	..	..
Chloasma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Elephantiasis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
IV. *Developmental Diseases.*																																
4. Diseases of Nutrition:																																
Atrophia	..	..	..	..	..	..	3	..	28	..	1	..	..	..	46	..	1	..	39	..	52	1	..	..	..	..	..	..	..	..	..	..
Senectus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
V. *Violent Deaths or Diseases.*																																
1. Accidental:																																
Ambustio	..	..	..	..	1	..	17	..	23	..	5	..	16	..	96	..	1	..	9	..	46	..	..	..	..	..	..	..	..	..	..	..
Explosio	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Gelatio	..	..	..	..	..	..	2	..	1	..	..	..	..	..	2	..	2	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Insolatio	..	..	..	..	..	..	..	..	3	1	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Submersio	..	..	..	..	..	1	..	1	2	4	..	..	1	1	3	12	..	..	..	2	2	10	..	..	..	..	..	..	..	..	..	..
Suspendium	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Asphyxia	..	..	..	..	..	..	..	..	1	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fractura	..	..	..	..	1	..	41	2	43	..	5	1	20	1	78	2	7	..	11	..	48	2	..	..	..	..	..	..	..	..	..	..
Amputatio	..	..	..	..	..	..	2	..	2	..	1	..	2	..	1	..	..	..	6	..	..	1	..	..	..	..	..	..	..	..	..	..
Contusio	..	..	..	..	56	..	654	1	568	1	106	..	107	..	584	..	72	..	162	..	493	..	..	..	..	..	..	..	..	..	..	..
Commotio	..	..	..	..	1	..	1	..	1	..	..	..	1	..	4	2	..	..	..	..	3	1	..	..	..	..	..	..	..	..	..	..
Vulnus Sclopetarium		..	..		1	..	1	..	4	..	2	..	3	..	16	..	..	..	2	..	11	..	..	..	..	..	..	..	..	..	..	..
„ Incisum	..	..	..	..	14	..	153	..	177	..	22	..	90	..	223	..	34	..	76	1	186	..	..	..	..	..	..	..	..	..	..	..

K

Appendix No. I.—*continued.*

Diseases.	Household Cavalry.		Cavalry.		Royal Artillery.		Military Train.		Foot Guards.		Infantry.		Cavalry Depôts.		Roy. Art. Depôt Brigade.		Infantry Depôt Battalions.	
Strength	1,219		9,528		10,021		1,817		5,811		26,719		1,101		3,314		21,970	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Luxatura	1	..	12	..	8	..	1	..	..	..	23	..	5	..	6	..	10	..
Subluxatio	15	..	131	..	217	..	22	..	102	..	455	..	8	..	63	..	282	..
Vesiculæ Pedis	..	..	9	..	48	..	1	..	13	..	126	..	4	..	7	..	66	..
Venenatio	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..
Morsus	..	..	3	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..
3. Homicidal:																		
Vulnus Sclopetarium	..	..	..	..	..	..	..	..	..	..	1	2	..	..	..	..	..	..
4. Suicidal:																		
Suspendium	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..
Venenatio	..	..	..	..	2	2	..	..	..	..	..	..	..	..	..	..	1	1
Vulnus Sclopetarium	..	..	..	..	..	1	..	..	1	1	1	1	..	..	..	..	..	..
Submersio	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Vulnus Incisum	..	..	..	..	..	1	..	..	..	..	3	1	..	..	..	..	..	..
5. Execution:																		
Suspendium	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..
6. Punitus	..	..	20	..	37	..	8	..	6	..	41	..	2	..	1	..	51	..
Diseases not specified	4	..	..	..	..	..	..	..	5	..	8	..	..	..	..	..	37	..
Total	684	12	9,238	62	10,130	75	1,678	14	4,612	52	22,677	205	1,481	8	4,498	34	20,652	249

APPENDIX No. II.

ABSTRACT, showing the Number of Men belonging to the Regiments serving at Home who were Vaccinated during the Year 1861.

	Results.	In those who bore marks of previous Small-pox.	In those who bore good marks of previous Vaccination.	In those who bore doubtful marks of previous Vaccination.	In those who bore no marks of previous Vaccination or Small-pox.	Total.
Soldiers, not Recruits	A perfect vaccine pustule	65	678	67	74	884
	A modified ditto	23	220	143	63	449
	A failure in	56	501	73	90	720
	Total	144	1,399	283	227	2,053
Recruits.	A perfect vaccine pustule	123	1,399	101	203	1,826
	A modified ditto	95	827	66	78	1,066
	A failure in	138	1,209	52	104	1,503
	Total	356	3,435	219	385	4,395

APPENDIX No. III.

ABSTRACT, showing the Ages of the Men serving in the different Arms at Home, and the Deaths at each Age in 1861.

	Under 20 Years.		20-24.		25-29.		30-34.		35-39.		40 and Upwards.		Total.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Household Cavalry	103	..	321	1	301	4	184	1	163	1	147	5	1,219	12
Cavalry of the Line	1,689	5	4,468	26	1,831	7	790	10	471	6	279	8	9,528	62
Royal Artillery ..	1,311	2	4,771	24	2,776	32	888	10	246	5	29	..	10,021	75
Military Train ..	295	1	1,008	8	383	2	77	1	33	..	21	2	1,817	14
Foot Guards.. ..	648	..	2,262	19	1,932	20	613	7	279	6	77	..	5,811	52
Infantry Regiments	5,363	14	10,456	71	5,520	58	3,129	37	1,957	20	294	5	26,719	205
Total	9,409	22	23,286	149	12,743	123	5,681	68	3,149	38	847	20	55,115	420
Cavalry Depôts ..	198	1	482	1	177	3	79	..	62	2	103	1	1,101	8
Depôt Brigade, R.A.	688	2	1,365	12	774	6	413	10	60	2	14	2	3,314	34
Depôt Battalions ..	7,370	43	6,411	69	3,320	41	2,376	36	1,864	33	629	17	21,970	244
Total of Depôts..	8,256	46	8,258	82	4,271	50	2,868	46	1,986	37	746	20	26,385	286

APPENDIX No. IV.

ABSTRACT, showing the Number of Recruits inspected, and the Number found unfit for Service at the Head Quarters of each of the Recruiting Districts.

Districts.		Primary Inspections.	Secondary Inspections.		Total.
			Had been previously examined by Staff Surgeon or other Army Medical Officer.	Had been previously examined by Private Medical Practitioner,	
London ..	Inspected	2,987	201	506	3,694
	Rejected	1,428	33	128	1,589
Liverpool..	Inspected	1,102	261	467	1,830
	Rejected	432	50	154	636
Bristol ..	Inspected	440	166	999	1,605
	Rejected	176	14	235	425
York ..	Inspected	192	132	517	841
	Rejected	64	20	124	208
Edinburgh	Inspected	413	9	123	545
	Rejected	172	2	30	204
Glasgow ..	Inspected	1,381	5	79	1,465
	Rejected	641	..	15	656
Dublin ..	Inspected	817	33	219	1,069
	Rejected	371	7	55	433
Cork ..	Inspected	284	50	132	466
	Rejected	155	9	44	208
Belfast ..	Inspected	377	25	274	676
	Rejected	166	2	73	241
Total	Inspected ..	7,993	882	3,316	12,191
	Rejected ..	3,605	137	858	4,600

APPENDIX No. V.

ABSTRACT, showing the Native Country of the Recruits inspected at the Head Quarters of each District.

Districts.	England.		Wales.		Scotland.		Ireland.		British Colonies or Foreign Countries.	
	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.
London ..	3,217	1,377	22	9	87	43	336	147	32	13
Liverpool ..	875	325	104	18	240	64	605	225	6	4
Bristol ..	1,316	348	104	30	16	5	159	40	10	2
York ..	668	158	5	3	36	12	129	35	3	..
Edinburgh ..	38	12	..	..	446	171	58	19	3	2
Glasgow ..	49	21	..	..	1,046	473	369	161	1	1
Dublin ..	46	13	..	..	5	3	1,002	414	16	3
Cork.. ..	15	2	..	..	4	2	446	204	1	..
Belfast ..	13	1	..	..	19	5	638	231	6	4
Total ..	6,237	2,257	235	60	1,899	778	3,742	1,476	78	29

APPENDIX No. VI.

ABSTRACT, showing the Number of Recruits inspected in 1861, at the following Ages and Heights.

Age and Country.	Under 5 ft. 3 in.	From 5 ft. 3 in. to 5 ft. 4 in.	From 5 ft. 4 in. to 5 ft. 5 in.	From 5 ft. 5 in. to 5 ft. 6 in.	From 5 ft. 6 in. to 5 ft. 7 in.	From 5 ft. 7 in. to 5 ft. 8 in.	From 5 ft. 8 in. to 5 ft. 9 in.	From 5 ft. 9 in. to 5 ft. 10 in.	From 5 ft. 10in. to 5 ft. 11 in.	From 5 ft. 11 in. to 6 ft.	Upwards of 6 ft.	Total.
Boys under 17—												
England ...	149	4	1	1	1	...	...	1	...	...	...	157
Scotland ...	9	1	...	...	...	...	...	...	...	...	...	10
Ireland ...	82	1	...	...	...	...	...	...	...	...	...	83
From 17 to 18—												
England ...	...	17	80	42	244	74	19	6	2	...	...	484
Scotland ...	...	1	29	2	11	5	2	1	...	...	...	51
Ireland ...	...	2	20	8	181	39	4	1	1	...	...	256
From 18 to 19—												
England ...	...	23	601	471	362	271	148	81	30	10	3	2,000
Scotland ...	...	...	168	104	105	122	47	20	13	5	1	585
Ireland ...	...	...	163	103	107	104	59	22	15	1	1	575
From 19 to 20—												
England ...	...	4	256	246	210	199	138	68	30	16	4	1,171
Scotland ...	...	...	34	44	48	89	48	29	15	5	5	317
Ireland ...	...	2	33	34	50	62	50	28	11	4	4	278
From 20 to 21—												
England ...	...	2	186	129	158	158	107	62	23	11	4	840
Scotland ...	...	...	25	22	55	62	42	20	10	6	5	247
Ireland ...	...	...	27	24	33	67	49	37	28	8	6	279
From 21 to 22—												
England ...	...	1	129	114	121	129	100	64	39	9	8	714
Scotland ...	...	...	24	17	22	41	24	14	8	4	4	158
Ireland ...	...	...	8	15	20	40	30	19	10	7	2	151
From 22 to 23—												
England ...	1	...	78	117	98	118	70	47	32	13	3	577
Scotland ...	...	...	7	13	21	41	31	20	9	1	4	147
Ireland ...	...	...	13	14	20	36	22	18	9	3	1	136
From 23 to 24—												
England ...	1	2	66	76	85	94	44	36	25	10	8	447
Scotland ...	...	...	11	12	14	26	11	16	4	1	4	99
Ireland ...	...	...	3	4	6	26	13	13	4	10	4	83
From 24 to 25—												
England ...	...	2	86	78	86	87	74	30	34	13	3	493
Scotland ...	...	...	9	9	26	37	23	8	6	4	4	126
Ireland ...	...	...	3	9	15	24	21	14	8	6	1	101
Upwards of 25—												
England ...	4	2	135	151	167	220	178	109	82	23	16	1,087
Scotland ...	...	...	19	15	46	69	53	28	24	10	6	270
Ireland ...	...	...	9	18	25	64	66	24	46	11	6	269
Total ...	246	64	2,223	1,892	2,337	2,304	1,473	836	518	191	107	12,191

APPENDIX No. VII.

ABSTRACT, showing the Number of Recruits inspected in 1861, at the following Weights and Ages.

Age and Country.	Under 100 lbs.	From 100 lbs. to 110 lbs.	From 110 lbs. to 120 lbs.	From 120 lbs. to 130 lbs.	From 130 lbs. to 140 lbs.	From 140 lbs. to 150 lbs.	From 150 lbs. to 160 lbs.	From 160 lbs. to 170 lbs.	From 170 lbs. and upwards.	Total.
Boys under 17—										
England	145	7	3	1	1	...	...	...	...	157
Scotland	7	1	2	...	...	...	...	...	...	10
Ireland	76	5	2	...	...	...	...	...	...	83
From 17 to 18—										
England	5	63	157	139	90	24	5	1	...	484
Scotland	8	16	19	7	1	...	...	...	...	51
Ireland	1	30	66	86	57	14	1	...	1	256
From 18 to 19—										
England	6	132	599	659	372	180	41	10	1	2,000
Scotland	4	54	192	180	116	34	3	2	...	585
Ireland	1	41	170	182	128	41	11	1	...	575
From 19 to 20—										
England	...	29	183	383	364	141	53	13	5	1,171
Scotland	...	9	45	93	97	61	9	2	1	317
Ireland	...	10	24	91	93	43	14	2	1	278
From 20 to 21—										
England	...	11	106	254	248	166	45	7	3	840
Scotland	...	4	35	70	77	43	14	4	...	247
Ireland	...	1	23	58	94	65	29	7	2	279
From 21 to 22—										
England	...	9	69	151	202	176	79	22	6	714
Scotland	...	2	10	34	62	31	12	7	...	158
Ireland	...	1	13	29	45	35	18	8	2	151
From 22 to 23—										
England	1	5	62	122	169	131	65	19	3	577
Scotland	...	...	6	32	51	36	14	8	...	147
Ireland	...	...	15	35	33	29	16	8	...	136
From 23 to 24—										
England	...	2	29	95	122	115	49	24	11	447
Scotland	...	1	5	20	36	28	2	6	1	99
Ireland	...	1	...	16	25	20	16	2	3	83
From 24 to 25—										
England	...	...	51	104	116	125	55	33	9	493
Scotland	...	...	13	38	30	23	13	4	5	126
Ireland	...	1	5	15	38	18	15	6	3	101
Upwards of 25—										
England	...	5	77	161	273	325	142	68	36	1,087
Scotland	...	7	22	54	80	57	32	15	3	270
Ireland	...	1	10	37	75	86	41	13	6	269
Total	254	448	2,013	3,146	3,095	2,047	794	292	102	12,191

APPENDIX No. VIII.

ABSTRACT, showing the State of Education of the Recruits examined at the Head Quarters of the Recruiting Districts in 1861.

Districts.	Well Educated.	Able to Write.	Able to Read.	Unable to Read.	Total.
London	47	2,562	82	1,003	3,694
Liverpool	178	994	209	449	1,830
Bristol	3	1,047	96	459	1,605
York	8	534	51	248	841
Edinburgh	23	391	79	52	545
Glasgow	37	906	237	285	1,465
Dublin	82	599	59	329	1,069
Cork	16	242	24	184	466
Belfast	1	333	129	213	676
Total	395	7,608	966	3,222	12,191
Country:					
England	236	5,137	438	2,159	7,970
Scotland	60	1,297	316	337	2,010
Ireland	99	1,174	212	726	2,211
Total	395	7,608	966	3,222	12,191

APPENDIX No. IX.

ABSTRACT, showing the Admissions into Hospital and Deaths among the Troops serving in the Mediterranean in the year 1861.

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles.	
Strength	5,520		6,185		4,064		605	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*								
1. Miasmatic Diseases:								
Variola	..	..	20	2	..	..	1	1
Varioloides	..	..	1	..	..	..	2	..
Varicella	..	..	1	..	..	..	..	..
Scarlatina	2	2	2	..	..	..	..	..
Parotitis	5	..	13	..	6	..	..	..
Tonsillitis	72	..	51	..	76	..	19	..
Influenza	12	..	3	..	8	..	..	..
Ophthalmia	206	..	598	..	149	..	41	..
Erysipelas	6	1	3	..	6	..	..	..
Furunculus	61	..	12	..	23	..	..	..
Dysenteria Acuta	34	2	30	2	8	..	1	..
„ Chronica	..	..	12	..	3	..	..	..
Diarrhœa	273	..	168	..	204	..	24	..

Appendix No. IX.—*continued.*

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles	
trength	5,520		6,185		4,064		605	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Cholera Biliosa	..	..	1	..	..	..	..	..
Febris Intermittens	23	..	11	..	70	..	..	..
„ Remittens	1	1	..	..	54	3	..	..
„ Typhoides	7	3	38	11	34	9	..	..
„ Continua	591	17	838	10	829	14	9	..
Anthrax	..	..	2	..	3	..	..	..
Rheumatismus Acutus	212	..	207	..	82	..	41	..
„ Chronicus	69	..	151	..	9	..	..	..
2. Enthetic Diseases:								
Syphilis Primaria	515	..	207	..	183	..	12	..
„ Secundaria	91	..	96	..	36	1	4	..
Iritis Syphilitica	8	..	6	..	2	..	..	..
Bubo	145	..	114	..	69	..	..	..
Gonorrhœa	506	..	182	..	156	..	36	..
Phymosis, &c.	1	..	4	..	3	..	..	..
Orchitis (Gonorrhœal)	34	..	12	..	21	..	2	..
Strictura Urethræ	11	..	11	..	7	..	..	..
Verrucæ	1	..	..	..	2	..	..	..
Ophthalmia (Gonorrhœal)	1	..	..	..	..	..	..	..
3. Dietic Diseases:								
Scorbutus	1	..	1	..	3	..	..	..
Purpura	..	..	1	..	..	..	..	..
Ebriositas	69	1	41	..	40	1	..	..
4. Parasitic Diseases:								
Porrigo	5	..	2	..	1	..	..	..
Scabies	7	..	20	..	6	..	3	..
Tænia Solium	23	..	45	..	4	..	..	..
Ascaris Lumbricoides	1	..	12	..	..	..	..	..
Vermes	..	..	..	..	6	..	..	..
Aphthæ	..	..	..	..	2	..	..	..
II. *Constitutional Diseases.*								
1. Diathetic Diseases:								
Lumbago	..	..	5	..	2	..	..	..
Anæmia	2	..	4	..	..	..	..	..
Anasarca	7	..	3	..	..	..	..	..
Carcinoma	1	..	..	..	..	..	..	..
Tumores	..	..	4	..	..	..	..	..
2. Tubercular Diseases:								
Scrofula	14	..	9	..	18	..	1	..
Phthisis Pulmonalis	30	1	43	14	28	4	1	..
Hæmoptysis	4	..	7	..	11	1	1	1
Meningitis Tuberculosa	1	..	..	..	1	..	..	..
III. *Local Diseases.*								
1. Of the Nervous System:								
Apoplexia	1	1	1	1	..	..	..	..
Paralysis	13	..	2	..	1	..	..	..
Delirium Tremens	14	1	8	..	9	..	..	..

Appendix No. IX.—*continued.*

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles.	
Strength	5,520		6,185		4,064		605	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Mania	3	..	1	..	4	..	..	..
Amentia	22	..	10	..	..	..	..	..
Epilepsia	8	..	10	..	15	1	1	..
Cephalæa	14	..	6	..	17	..	1	..
Neuralgia	4	..	16	..	2	..	..	..
Dysecœa	3	..	..	..	3	..	..	..
Otitis	25	..	31	..	20	..	..	..
Chorea	1	..	..	..	..	..	..	..
Convulsio	5	..	1	..	2	..	..	..
Iritis	1	..	..	..	..	..	..	..
Amaurosis	2	..	..	..	1	..	..	..
Myelitis	..	..	1	1	..	..	1	..
Cæcitas	1	..	5	..	2	..	..	..
Cataractes	4	..	1	..	1	..	..	..
Fistula Lachrymalis	..	..	1	..	..	..	..	..
Encephalitis	..	..	1	..	..	..	..	..
Polypus Nasi	..	..	..	..	2	..	..	..
2. Of the Circulatory System:								
Carditis	3	1	..	..	..	..	..	..
Pericarditis	1	..	1	..	2	..	..	..
Hypertrophia cordis	9	2	20	2	15	..	1	..
Aneurisma Aortæ	..	..	..	1	1	..	..	..
Aneurisma	..	1	2	..	..	..	..	..
Varix	6	..	2	..	2	..	..	..
Syncope	..	..	4	..	1	..	..	..
3. Of the Respiratory System:								
Laryngitis	..	..	..	..	1	..	..	..
Bronchitis Acuta	258	..	142	1	136	..	37	..
„ Chronica	46	..	6	2	15	1	..	..
Pleuritis	17	..	21	1	8	1	..	..
Pneumonia	10	1	11	1	16	1	..	..
Asthma	1	..	2	..	4	..	3	..
Epistaxis	1	..	..	..	..	..	..	..
Angina Pectoris	..	..	..	..	4	..	..	..
Dyspnœa	..	..	..	..	3	..	..	..
4. Of the Digestive System:								
Intus-susceptio	..	..	1	1	..	..	..	..
Pharyngitis	..	..	2	..	..	..	..	..
Gastritis	..	..	1	..	1	..	..	..
Enteritis	1	..	1	..	3	1	..	..
Peritonitis	2	..	1	..	..	..	..	..
Obstipatio	13	..	4	..	15	..	..	..
Dyspepsia	102	..	81	..	100	..	83	..
Colica	14	..	30	..	17	..	..	..
Hæmatemesis	..	..	..	..	6	1	..	..
Hernia Inguinalis	10	..	9	..	6	..	..	..
Hæmorrhois	27	..	19	..	17	..	2	..
Fistula in ano	2	..	5	..	1	..	..	..
Splenitis	1	..	1	..	2	..	..	..
Hepatitis Acuta	6	1	14	..	11	..	..	..

Appendix No. IX.—*continued.*

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles.	
Strength	5,520		6,185		4,064		60	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Hepatitis Chronica	12	1	8	1	3	..	..	..
Icterus	62	..	42	..	16	..	1	..
Ascites	1	..	1	1	..	..	..	..
Prolapsus ani	2	..	..	..	..	..	..	..
Chololithus	..	..	1	..	..	..	..	..
Ranula	..	..	1	..	..	..	..	..
5. Of the Urinary System:								
Nephritis	1	..	..	..	..	..	..	..
Nephria	2	1	3	..	..	..	..	..
Ischuria	5	..	1	..	..	..	..	..
Diuresis	..	..	1	..	..	..	..	..
Hæmaturia	1	..	2	..	..	..	..	..
Lithiasis	1	..	1	..	..	..	..	..
Cystitis	1	..	..	..	..	..	..	..
Enuresis	10	..	1	..	3	..	..	..
Morbus Prostaticus	..	..	..	..	1	..	..	..
6. Of the Reproductive System:								
Varicocele	..	..	1	..	..	..	..	..
Hydrocele	4	..	8	..	2	..	..	..
Orchitis (not Gonorrhœal)	119	..	75	..	11	..	3	..
7. Of the Locomotive System:								
Arthritis	4	..	3	..	..	..	..	..
Synovitis	17	..	13	..	3	..	..	..
Contractura	1	..	2	..	3	..	..	..
Periostitis	5	..	..	..	5	..	..	..
Necrosis	..	..	3	..	3	..	..	..
Atrophia musculorum	..	..	..	..	2	..	..	..
8. Of the Integumentary System:								
Urticaria	1	..	2	..	..	..	..	..
Eczema	14	..	14	..	13	..	..	..
Herpes	12	..	11	..	11	..	9	..
Impetigo	2	..	1	..	20	..	..	..
Psoriasis	8	..	7	..	7	..	..	..
Lichen	6	..	1	..	1	..	..	..
Mentagra	1	..	1	..	..	..	..	..
Pityriasis	1	..	..	..	..	..	..	..
Roseola	2	..	..	..	..	..	..	..
Hordeolum	1	..	1	..	..	..	..	..
Ecthyma	..	..	1	..	1	..	..	..
Rupia	..	..	1	..	..	..	..	..
Labium Leporinum	..	..	1	..	..	..	..	..
Lepra	..	..	3	..	3	..	..	..
Pemphigus	..	..	..	..	5	..	..	..
Icthyosis	..	..	..	..	1	..	..	..
Acne	..	..	..	..	1	..	..	..
Phlegmon	334	..	373	..	245	..	..	..
Abscessus	106	..	64	..	52	..	58	..
Paronychia	16	..	24	..	12	..	..	..
Ulcus	192	..	169	..	122	..	34	..

Appendix No. IX.—*continued.*

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles.	
Strength	5,520		6,185		4,064		605	
Diseases.	Admitted.	Died.	Admitted	Died.	Admitted.	Died.	Admitted.	Died.
IV. *Developmental Diseases.*								
4. Diseases of Nutrition:								
Atrophia	11	..	..	..	16	..	..	..
V. *Violent Deaths and Diseases.*								
1. Accidental:								
Ambustio	8	..	6	..	14	..	2	..
Explosio	1	..	..	..	1	..	..	..
Insolatio	1	..	1	..	..	..	..	..
Submersio	..	1	4	2	..	1	..	..
Fractura	10	2	24	2	8	..	1	1
Amputatio	2	..	1	..	1	..	..	..
Tetanus Traumaticus	..	..	..	..	1	1	1	1
Contusio	215	..	227	..	151	..	44	1
Commotio	..	..	2	1	..	..	..	..
Vulnus Sclopetarium	1	..	3	..	4	..	..	..
„ Incisum	100	..	95	..	101	..	25	..
Luxatura	2	..	..	..	3	..	..	..
Subluxatio	83	..	81	..	56	..	1	..
Vesiculæ Pedis	14	..	9	..	6	..	..	..
Morsus	..	..	..	..	1	..	..	..
3. Homicidal:								
Vulnus Incisum	1	1	..	..	..	..	..	..
„ Sclopetarium	..	..	..	..	1	1	..	1
4. Suicidal:								
Vulnus Sclopetarium	..	1	..	1	..	1	..	..
Venenatio	1	..	..	..	..	1	..	..
5. Execution:								
Vulnus Sclopetarium	..	..	..	1	..	..	..	..
Suspendium	..	..	..	..	..	1	..	..
6. Punitus	15	..	15	..	7	..	..	..
Diseases not specified	7	..	..	..	..	..	..	..
Total	5,119	43	4,775	59	3,548	45	506	5

Causes of the Deaths among the Invalids.

	From Gibraltar.	From Malta.	From the Ionian Islands.
Dysenteria Chronica	..	1	1
Phthisis Pulmonalis	5	6	..
Morbus Valvæ Cordis	..	1	..
Nephria	1	2	..
Caries	1	..	..
Total	7	10	1

APPENDIX No. X.

ABSTRACT, showing the Diseases of the Men sent home as Invalids from the Mediterranean during the Year 1861.

Sent Home for	Gibraltar.		Malta.		Ionian Islands.	
	Discharge.	Change of Climate.	Discharge.	Change of Climate.	Discharge.	Change of Climate.
Febris Typhoides	..	1	..	..	..	1
„ Continua	..	17	..	..	..	..
Dysenteria	..	..	..	1	..	1
Diarrhœa	..	1	..	..	1	..
Ophthalmia	1	9	8	10	..	2
Rheumatismus	4	14	4	2	4	4
Syphilis Secundaria	1	4	..	3	2	..
Strictura Urethræ	1	..	..	..	2	1
Anasarca	..	..	1	..	..	..
Scorbutus	..	..	..	..	..	1
Scrofula	1	5	..	..	..	1
Phthisis	10	16	10	12	14	3
Hæmoptysis	..	..	..	..	..	3
Meningitis Tuberculosa	1	..	..	..	..	..
Encephalitis	..	..	1	..	..	..
Amentia	2	1	1	1	2	..
Dementia	3	2	3	1	..	..
Melancholia	..	1	..	..	..	..
Mania	2	1	..	..	3	2
Epilepsia	1	1	3	1	6	2
Convulsio	..	..	1	1	..	..
Paralysis	3	1	1	..	1	1
Amaurosis	..	1	..	..	..	..
Cataractes	2	..	..	..	1	..
Corneitis	1	1	..	..	..	..
Cœcitas	1	..	..	1	1	..
Dysecœa	..	1	..	..	1	1
Otitis	..	..	..	1	..	..
Carditis	1	..	..	..	1	..
Hypertrophia Cordis	1	..	3	1	..	..
Morbus Valv: Cordis	2	1	2	4	4	..
Varix	..	..	..	..	2	..
Laryngitis	..	..	..	..	1	1
Bronchitis	1	20	1	3	5	1
Pneumonia	..	1	1	..	..	..
Pleuritis	..	..	..	1	..	..
Peritonitis	..	1	..	..	..	..
Obstipatio	..	..	..	..	1	..
Dyspepsia	..	3	..	1	2	..
Hepatitis	1	3	2	2	4	..
Splenitis	..	1	..	1	..	..
Hæmorrhois	..	..	1	..	..	..
Ascites	..	1	..	..	..	..
Chololithus	..	..	..	1	..	..
Fistula in Ano	..	..	..	2	..	..
Nephria	..	1	..	1	..	..
Enuresis	..	..	..	..	1	..
Orchitis	..	1	..	1	..	..
Arthritis	..	..	1	..	..	..

Appendix No. X.—*continued.*

Sent Home for ..	Gibraltar.		Malta.		Ionian Islands.	
	Discharge.	Change of Climate.	Discharge.	Change of Climate.	Discharge.	Change of Climate.
Synovitis..	..	1	..	..	1	..
Periostitis	..	1	..	..	..	..
Necrosis	..	..	..	1	1	3
Contractura	..	..	1	..	2	..
Phlegmon	1	..	..	..	..	..
Abscessus	1	..	..	..	1	..
Ulcus	3	..	..	..	2	..
Atrophia	1	1	..	..	4	..
Asthenia	1	11	..	..	..	..
Curvatura Spinalis ..	1	..	..	..	1	..
Malformatio Pedis ..	1	..	..	..	3	..
Contusio	..	1	..	1	..	..
Fractura	2	1	1	..	..	..
Amputatio	1	..	2	..	..	..
"Worn out"	..	..	9	..	..	..
Total	51	126	57	54	74	28

APPENDIX No. XI.

ABSTRACT, showing the Ages of the Troops serving in the Mediterranean Commands, and the Deaths at each Age, during the Year 1861.

		Under 20 Years.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
		Strength on 1 April.	Deaths during Year.	Strength on 1 April.	Deaths during Year.	Strength on 1 April.	Deaths during Year.	Strength on 1 April.	Deaths during Year.	Strength on 1 April.	Deaths during Year.	Strength on 1 April.	Deaths during Year.
Gibraltar	2nd Battalion 6th Regiment ..	22	1	547	1	184	1	56	..	7	..	2	..
	2nd „ 7th „ ..	25	..	570	8	81	4	63	..	7	..	1	..
	2nd „ 8th „ ..	44	..	570	3	152	2	64	..	18	2	2	..
	1st „ 25th „ ..	54	..	355	1	211	2	73	..	81	1	21	1
	100th Regiment	15	..	400	..	275	1	145	1	6	..	..	..
Malta	2nd Battalion 3rd Regiment ..	43	..	702	..	94	1	22	1	10	..	3	..
	2nd „ 15th „ ..	120	1	464	1	168	1	60	..	27	..	7	..
	1st „ 22nd „ ..	46	2	400	6	192	5	83	1	126	2	1	1
	2nd „ „ „ ..	64	1	458	4	226	1	80	2	33	..	5	1
	4th „ Rifle Brigade ..	108	..	564	3	156	4	29	..	8	..	1	..
Ionian Islands ..	2nd „ 2nd Regiment ..	40	1	633	5	152	1	29	..	5	..	5	..
	2nd „ 4th „ ..	66	..	559	10	161	..	57	..	11	..	1	..
	1st „ 9th „ ..	109	..	466	10	170	5	78	1	27	..	..	..
	2nd „ „ „ ..	48	..	586	2	140	1	70	1	13	..	2	..
Total		804	6	7,274	54	2,362	29	909	7	379	5	51	3

The Return of the Ages of the Men furnished by the Officer commanding the 2nd Battalion 23rd Regiment was so manifestly incorrect that it was impossible to include it in the preceding Abstract.

APPENDIX No. XII.

ABSTRACT showing the Admissions into Hospital and Deaths among the Troops serving in British America in the year 1861.

Stations	Bermuda		Nova Scotia.		Canada.		Newfoundland		British Columbia.	
Strength	1,010		1,725		3,503		196		130	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*										
1. Miasmatic Diseases:										
Variola	..	..	1	..	5	..	1	..	..	..
Varioloides	..	..	5	1	..	..	..	..	..	..
Diphtheria	..	..	..	..	..	..	7	..	..	..
Parotitis	..	..	1	..	1	..	..	..	..	..
Tonsillitis	7	..	42	..	66	..	8	..	4	..
Influenza	3	..	4	..	2	..	17	..	22	..
Ophthalmia	31	..	34	..	37	..	2	..	..	..
Erysipelas	3	..	3	..	8	..	1	..	..	..
Furunculus	4	..	8	..	15	..	1	..	..	..
Dysenteria Acuta	19	..	..	..	6	..	..	..	..	..
Diarrhœa	26	..	29	..	162	..	5	..	2	..
Cholera Biliosa	..	..	1	..	2	..	..	..	..	..
Febris Intermittens	..	..	..	..	9	..	..	..	..	..
„ Remittens	..	..	..	..	4	..	..	..	2	..
„ Continua	3	..	13	..	49	2	..	..	..	..
Anthrax	..	..	3	..	2	..	..	..	..	..
Rheumatismus Acutus	22	..	42	..	80	..	18	..	..	..
„ Chronicus	4	..	1	..	..	..	..	..	6	..
2. Enthetic Diseases:										
Syphilis Primaria	11	..	36	..	203	..	..	..	12	..
„ Secundaria	9	..	16	..	72	..	2	..	..	..
Iritis Syphilitica	..	..	1	..	6	..	..	..	..	..
Bubo	5	..	1	..	24	..	1	..	7	..
Gonorrhœa	25	..	86	..	127	..	..	..	3	..
Orchitis (Gonorrhœal)	2	..	2	..	16	..	..	..	..	..
trictura Urethræ	4	..	9	..	5	..	..	..	..	..
3. Dietic Diseases:										
Purpura	..	..	..	..	1	..	..	..	..	..
Ebriositas	19	..	39	..	77	1	4	..	2	..
4. Parasitic Diseases:										
Porrigo	..	..	4	..	8	..	..	..	..	..
Scabies	4	..	7	..	22	..	..	..	..	..
Tænia Solium	..	..	..	..	1	..	..	..	..	..
Phthiriasis	..	..	..	..	3	..	..	..	..	..
Pulex Penetrans	1	..	..	..	..	..	..	..	..	..
II. *Constitutional Diseases.*										
1. Diathetic Diseases:										
Podagra	..	..	..	..	..	..	1	..	..	..
Anasarca	..	..	..	..	..	..	1	..	..	..

Appendix No. XII.—*continued.*

Stations	Bermuda.		Nova Scotia.		Canada.		Newfoundland		British Columbia.	
Strength	1,010		1,725		3,503		196		130	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
2. Tubercular Diseases:										
Scrofula	..	..	4	..	2	..	..	..	..	..
Phthisis Pulmonalis	5	1	16	2	11	3	..	..	..	..
Hæmoptysis	1	..	7	..	6	..	..	..	..	..
III. *Local Diseases.*										
—1. Of the Nervous System:										
Meningitis	1	..	..	..	..	..	..	..	..	..
Apoplexia	..	..	..	1	1	2	..	..	..	..
Paralysis	..	..	2	..	5	1	..	..	..	..
Delirium Tremens	10	4	7	1	16	1	..	..	1	..
Mania	1	..	..	..	..	..	1	..	1	..
Amentia	..	..	1	..	3	..	1	..	..	..
Epilepsia	..	..	3	..	7	1	2	..	..	..
Cephalæa	..	..	3	..	4	..	..	..	..	..
Neuralgia	3	..	2	..	5	..	..	..	..	..
Dysecœa	1	..	2	..	1	..	2	..	..	..
Otitis	4	1	4	..	4	..	..	..	..	..
Encephalitis	..	..	..	1	..	..	..	..	..	..
Cæcitas	..	..	..	..	1	..	..	..	..	..
Iritis	..	..	..	..	1	..	..	..	..	..
Amaurosis	..	..	..	..	1	..	..	..	..	..
Vertigo	..	..	..	..	1	..	..	..	..	..
2. Of the Circulatory System:										
Carditis	..	..	..	..	2	..	..	..	..	..
Pericarditis	..	..	1	..	1	..	..	..	..	..
Hypertrophia Cordis	2	1	4	1	2	..	..	..	..	..
Aneurisma	1	1	..	..	2	2	..	..	..	..
Varix	1	..	2	..	2	..	..	..	..	..
Angina Pectoris	..	..	1	..	..	..	..	..	..	..
3. Of the Respiratory System:										
Laryngitis	..	..	..	..	5	..	..	..	..	..
Bronchitis Acuta	29	..	103	..	170	1	6	..	..	..
„ Chronica	3	..	..	..	..	..	..	..	..	..
Pleuritis	1	..	16	..	7	1	2	1	..	..
Pneumonia	..	..	22	1	28	2	1	1	..	..
Apoplexia Pulmonalis	..	..	..	1	..	..	..	..	..	..
Asthma	..	..	2	..	..	1	..	..	..	..
Epistaxis	..	..	..	..	1	..	..	..	..	..
Emphysema	..	..	1	..	..	..	..	..	..	..
4. Of the Digestive System:										
Pharyngitis	..	..	..	..	2	..	..	..	..	..
Gastritis	4	..	..	..	..	..	..	..	..	..
Enteritis	..	..	1	..	2	1	..	..	..	..
Peritonitis	..	..	..	1	..	..	..	..	..	..
Obstipatio	..	..	6	..	5	..	1	..	..	..
Dyspepsia	34	..	26	..	76	..	1	..	..	..
Colica	3	..	9	..	3	..	..	..	..	..

Appendix No. XII.—*continued.*

Stations	Bermuda.		Nova Scotia.		Canada.		Newfoundland.		British Columbia.	
Strength	1,010		1,725		3,503		196		130	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Hæmatemesis	..	..	..	..	2	..	..	..	..	..
Hernia Inguinalis	1	..	2	..	3	..	..	..	..	..
Hæmorrhois	1	..	4	.	11	..	2	..	..	..
Fistula in Ano	3	..	1	..	4	..	..	..	..	..
Hepatitis Acuta	3	1	..	..	16	..	..	..	..	..
„ Chronica	2	..	3	..	..	..	..	..	..	..
Icterus	..	..	8	..	2	..	2	..	..	..
Ascites	..	..	3	..	..	..	..	..	..	..
Melæna	..	..	3	..	..	..	..	..	..	..
5. Of the Urinary System :										
Nephritis	..	..	..	..	1	..	..	..	..	..
Nephria	..	..	5	..	2	..	..	..	..	..
Ischuria	..	..	1	..	1	..	..	..	..	..
Hæmaturia	..	..	1	..	..	..	..	..	..	..
Lithiasis	..	..	..	..	1	..	..	..	..	..
Cystitis	1	..	1	..	3	..	..	..	..	..
Enuresis	..	..	4	..	..	..	..	..	..	..
Diabetes	..	..	1	..	1	1	..	..	..	..
6. Of the Reproductive System :										
Hydrocele	..	..	..	..	2	..	..	..	..	..
Orchitis (not Gonorrhœal)	14	..	4	..	22	..	1	..	1	..
7. Of the Locomotive System :										
Arthritis	1	..	1	..	..	..	1	..	..	..
Synovitis	1	..	5	..	3	..	1	..	..	..
Contractura	1	..	..	..	..	..	..	..	..	..
Periostitis	..	..	1	..	1	..	1	..	..	..
Caries	..	..	..	..	1	..	..	..	..	..
Hydrarthrus	..	..	..	..	4	..	..	..	..	..
8. Of the Integumentary System :										
Urticaria	..	..	..	..	1	..	..	..	..	..
Eczema	1	..	3	..	3	..	1	..	..	..
Herpes	..	..	6	..	3	..	..	..	2	..
Impetigo	..	..	2	..	2	..	1	..	..	..
Psoriasis	1	..	3	..	8	..	1	..	1	..
Mentagra	..	..	3	..	..	..	..	..	..	..
Prurigo	..	..	2	..	..	..	..	..	..	..
Pityriasis	3	..	..	..	..	..	..	..	..	..
Acne	..	..	1	..	..	..	..	..	..	..
Phlegmon	44	..	55	..	123	..	4	..	3	..
Abscessus	5	..	6	..	40	..	8	..	..	..
Paronychia	2	..	6	..	8	..	..	..	1	..
Ulcus	5	..	32	..	102	..	2	..	3	..
IV. *Developmental Diseases.*										
4. Diseases of Nutrition :										
Atrophia	1	..	..	..	2	..	..	..	..	..
V. *Violent Deaths or Diseases.*										
1. Accidental :										
Ambustio	..	..	8	..	14	..	..	..	..	..
Gelatio	..	..	25	..	23	..	..	..	..	1

Appendix No. XII.—*continued.*

Stations	Bermuda.		Nova Scotia.		Canada.		Newfoundland.		British Columbia.	
Strength	1,010		1,725		3,503		196		130	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Insolatio	..	..	1	..	..	..	..	..	..	..
Submersio	..	1	..	..	..	9	..	..	..	..
Fractura	1	..	7	..	20	2	1	..	1	..
Amputatio	..	..	1	..	..	..	..	..	..	..
Contusio	32	..	49	..	119	..	8	..	9	..
Vulnus Sclopetarium	..	..	..	..	3	1	..	..	..	..
„ Incisum	19	..	81	..	79	..	4	..	11	..
Luxatura	..	..	..	..	2	..	2	..	..	..
Subluxatio	10	..	33	..	62	..	..	..	3	..
Vesiculæ Pedis	..	..	6	..	..	..	..	..	..	..
Venenatio	..	..	..	..	..	..	..	..	..	..
Morsus Hominis	..	..	1	..	..	..	..	..	..	..
4. Suicidal:										
Suspendium	..	2	..	1	..	..	..	..	..	..
Vulnus Incisum	..	1	..	..	..	..	..	..	..	..
Fractura	..	..	..	..	..	1	..	..	..	..
6. Punitus	2	..	..	..	6	..	..	..	..	..
Diseases not specified	6	..	..	..	..	..	1	..	..	..
Total	466	13	1012	11	2090	33	127	2	97	1

Causes of the Deaths of the Invalids.

	Bermuda.	Nova Scotia.
Phthisis Pulmonalis	1	2

APPENDIX No. XIII.

ABSTRACT, showing the Number of Men sent Home from British America in 1861, recommended to be discharged as Invalids, or for Change of Climate.

Diseases.	Bermuda.		Nova Scotia, &c.		Canada.		Newfoundland.	
	For Discharge.	For Change of Climate.	For Discharge.	For Change of Climate.	For Discharge.	For Change of Climate.	For Discharge.	For Change of Climate.
Ophthalmia	..	..	..	1	1	..	..	..
Rheumatismus	..	..	3	3	6	2	..	1
Purpura	..	..	..	..	..	1	..	..
Phthisis Pulmonalis	3	2	..	9	2	..	1	..
Hæmoptysis	..	..	..	2	..	..	..	..
Paralysis	..	..	1	..	1	..	..	..
Mania	1	..	..	1	..	..	1	..
Amentia	..	..	2	..	6	..	..	..
Epilepsia	..	..	1	..	1	..	..	..
Cephalæa	..	..	..	..	1	..	..	..
Dysecœa	..	..	1	..	1	..	2	..
Otitis	..	..	1	..	..	..	..	..
Carditis	..	..	..	..	1	..	..	..
Hypertrophia Cordis	1	..	1	..	4	..	..	..
Varix	..	..	1	..	..	..	..	..
Bronchitis	..	..	..	5	2	1	..	..
Pleuritis	..	..	..	..	1	1	..	..
Pneumonia	..	..	..	..	..	..	..	1
Asthma	..	1	..	..	..	..	..	..
Lithiasis	..	..	..	..	..	2	..	..
Diabetes	..	..	..	1	..	..	..	..
Orchitis	..	..	..	1	..	..	..	..
Contractura	1	..	..	..	..	..	..	..
Hydrarthrus	..	..	1	..	..	..	..	..
Atrophia	1	..	..	1	..	..	..	..
Gelatio	..	..	2	..	..	..	..	..
Fractura	..	..	..	..	1	..	..	..
Amputatio	..	..	2	..	..	..	..	..
Contusio	..	1	..	..	..	..	..	..
Total	7	4	16	24	28	7	4	2

APPENDIX No. XIV.

ABSTRACT, showing the Ages of the Troops serving in British America, and the Deaths at each Age during the year 1861.

Station.	Corps.	Under 20.		20—24.		25—29.		30—34.		35—39.		40 and upwards.		Total.	
		Strength, 1st April.	Died.	Strength, 1st April.	Died.	Strength, 1st April.	Died.	Strength, 1st April.	Died.	Strength, 1st April.	Died.	Strength, 1st April.	Died.	Strength, 1st April.	Died.
Bermuda	Royal Artillery ..	1	..	57	..	38	..	16	..	4	..	2	..	118	..
	39th Foot	21	..	367	4	261	8	132	1	29	1	3	..	813	14
Nova Scotia and New Brunswick	Royal Artillery ..	7	..	114	..	101	2	13	..	8	..	..	..	243	2
	Royal Engineers ..	3	..	26	..	24	..	23	..	..	6	1	..	83	..
	62nd Foot	30	..	332	2	227	1	73	..	25	..	5	..	692	3
	63rd „	28	1	304	3	248	1	116	1	30	2	4	..	730	8
Canada .	Royal Artillery ..	38	..	176	4	118	1	74	..	20	..	3	..	429	5
	1st Batt. 17th Foot	40	..	329	..	293	3	99	1	33	1	7	..	801	5
	Royal Canadian Rifles ..	21	..	4	..	24	..	195	4	281	6	578	6	1,103	16
Newfoundland	Royal Newfoundland Companies	4	..	43	..	39	..	41	..	50	1	41	1	218	2
	Total	172	1	1,748	13	1,349	16	587	3	205	5	66	1	4,127	39

APPENDIX No. XV.

ABSTRACT, showing the Admissions into Hospital and Deaths among the White Troops serving in the Windward and Leeward Command and Jamaica, in the year 1861.

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations.							
					Barbadoes.		St. Lucia.		Trinidad.		British Guiana.	
Strength	636		1,259		787		94		225		153	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*												
1. Miasmatic:												
Morbilli	..	..	4	..	2	..	..	..	2	..	..	..
Parotitis	1	..	..	..	..	..	..	..	..	..	..	..
Tonsillitis	6	..	6	..	5	..	1	..	2	..	..	..
Influenza	..	..	8	..	..	..	..	..	6	..	2	..
Ophthalmia	57	..	159	..	123	..	2	..	12	..	23	..
Erysipelas	1	..	5	..	1	..	1	..	..	..	..	..
Furunculus	5	..	14	..	1	..	..	..	6	..	6	..
Dysenteria Acuta	5	1	4	..	2	..	..	..	..	..	2	..
„ Chronica.	1	..	2	..	..	..	1	..	..	..	..	..
Diarrhœa	32	..	73	..	34	..	12	..	19	..	8	..
Cholera Biliosa	..	..	1	..	..	..	1	..	..	..	..	..
Febris Intermittens	39	..	250	..	9	..	..	..	115	..	120	..
„ Remittens	6	..	124	..	64	..	19	..	1	..	46	..
„ Icterodes	..	1	7	..	..	..	..	..	..	..	7	..
„ Continua	66	1	3	..	..	..	..	..	..	..	3	..
Anthrax	..	..	1	..	1	..	..	..	..	..	..	..
Rheum: Acutus	6	..	8	..	3	..	3	..	..	..	2	..
„ Chronicus	2	..	15	..	7	..	1	..	6	..	2	..
2. Enthetic:												
Syphilis Primaria	6	..	35	..	33	..	..	..	..	..	2	..
„ Secundaria	9	..	7	..	6	..	..	..	1	..	..	..
Bubo	5	..	14	..	12	..	..	..	1	..	..	..
Gonorrhœa	25	..	29	..	23	..	1	..	6	..	..	..
Orchitis (Gonorr.)	2	..	2	..	3	..	..	..	..	..	..	..
Strictura Urethræ	5	..	4	..	2	..	..	..	2	..	..	..
3. Dietic:												
Scorbutus	..	..	1	..	1	..	..	..	..	..	..	..
Ebriositas	25	..	49	..	38	..	6	..	1	..	4	..
4. Parasitic:												
Porrigo	2	..	..	..	..	..	..	..	..	..	..	..
Tænia Solium	1	..	3	..	3	..	..	..	..	..	..	..
II. *Constitutional Diseases.*												
1. Diathetic:												
Lumbago	..	..	2	..	2	..	..	..	..	..	..	..
Anæmia	..	..	4	..	3	..	..	..	1	..	..	..
Anasarca	1	..	..	..	..	..	..	..	..	..	..	..

Appendix No. XV.—*continued.*

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations.							
					Barbadoes.		St. Lucia.		Trinidad.		British Guiana.	
Strength	636		1,259		787		94		225		153	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
2. Tubercular:												
Scrofula	..	..	3	..	2	..	..	..	..	..	1	..
Phthisis Pulmonalis.	3	..	12	1	12	..	..	..	..	1	1	..
Hæmoptysis	..	..	3	1	2	1	..	..	..	..	..	..
III. *Local Diseases.*												
1. Nervous:												
Meningitis	..	..	1	..	1	..	..	..	..	..	..	..
Apoplexia	..	..	..	1	..	1	..	..	..	..	..	..
Paralysis	..	..	2	..	..	..	..	..	2	..	..	..
Delirium Tremens	9	..	13	..	2	..	2	..	3	..	5	..
Mania	..	..	2	..	2	..	..	..	..	..	..	..
Amentia	1	..	1	..	1	..	..	..	..	..	..	..
Cephalæa	..	..	2	..	..	..	..	..	..	..	..	..
Neuralgia	1	..	1	..	1	..	..	..	..	..	2	..
Otitis	3	..	17	..	9	..	4	..	3	..	1	..
2. Circulatory:												
Pericarditis	1	1	..	..	..	..	..	..	..	..	..	..
Hypertrophia cordis.	4	..	5	..	3	..	..	..	2	..	..	..
Varix	1	..	..	..	..	..	..	..	..	..	..	..
3. Respiratory:												
Bronchitis Acuta	21	..	30	..	28	..	..	..	1	..	2	..
„ Chronica.	4	..	7	..	3	..	..	..	..	..	2	..
Pleuritis	1	..	1	..	..	..	..	..	..	..	1	..
Pneumonia	1	..	..	..	..	..	..	..	..	..	..	..
4. Digestive:												
Stomatitis	..	..	2	..	2	..	..	..	..	..	..	..
Obstipatio	..	..	2	..	..	..	1	..	..	..	..	..
Dyspepsia	9	..	54	..	24	..	2	..	5	..	2	..
Colica	3	..	13	..	27	..	2	..	8	..	..	..
Intussusceptio	..	..	1	1	..	..	..	..	1	1	..	..
Hæmatemesis	1	1	2	..	1	..	..	..	1	..	..	..
Hernia Inguinalis	1	..	..	..	..	..	..	..	..	..	..	..
Hœmorrhois	3	..	14	..	8	..	2	..	3	..	1	..
Prolapsus ani	..	..	2	..	2	..	..	..	..	..	..	..
Fistula in ano	1	..	2	..	1	..	..	..	..	..	1	..
Hepatitis Acuta	..	..	..	..	..	..	..	..	1	..	..	..
„ Chronica	1	..	1	..	..	..	..	..	..	..	..	..
Icterus	..	..	2	1	1	..	1	1	..	..	..	..
5. Urinary:												
Ischuria	2	..	..	..	..	..	..	..	..	..	..	..
Enuresis	1	..	..	..	..	..	..	..	..	..	..	..
6. Reproductive:												
Orchitis (not Gon.)	..	..	26	..	20	..	..	..	5	..	1	..

Appendix No. XV.—*continued.*

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations.							
					Barbadoes.		St. Lucia.		Trinidad.		British Guiana.	
Strength	636		1,259		787		94		225		153	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
7. Locomotive:												
Arthritis	1	..	..	..	..	..	..	..	..	..	..	..
Synovitis	..	..	4	..	3	..	..	..	1	..	..	..
Periostitis	..	..	2	..	1	..	..	..	1	..	..	..
Necrosis	..	..	1	..	1	..	..	..	..	..	..	..
8. Integumentary:												
Eczema	4	..	19	..	15	..	3	..	1	..	..	..
Herpes	1	..	..	..	..	..	..	..	..	..	..	..
Impetigo	..	..	1	..	1	..	..	..	..	..	..	..
Psoriasis	1	..	..	..	..	..	..	..	..	..	..	..
Phlegmon	33	..	116	..	104	..	6	..	..	..	7	..
Abscessus	2	..	21	..	2	..	..	..	10	..	8	..
Paronychia	1	..	5	..	4	..	1	..	..	..	..	..
Ulcus	16	..	21	..	15	..	3	..	1	..	2	..
IV. *Developmental Diseases.*												
1. Atrophia	3	..	1	..	1	..	..	..	..	..	..	..
V. *Violent Deaths or Diseases.*												
1. Accidental:												
Ambustio	2	..	1	..	1	..	..	..	..	..	..	..
Insolatio	..	..	..	1	..	..	..	..	..	..	..	1
Fractura	2	..	9	..	6	..	..	..	3	..	..	..
Contusio	34	..	59	..	45	..	3	..	6	..	5	..
Vulnus Sclop:	..	..	1	..	1	..	..	..	..	..	..	..
„ Incisum	27	..	21	..	15	..	4	..	3	..	..	..
Luxatura	1	..	5	..	4	..	..	..	1	..	..	..
Subluxatio	10	..	29	..	15	..	10	..	..	..	3	..
Vesiculæ Pedis	3	..	..	..	..	..	..	..	..	..	..	..
4. Suicidal:												
Vulnus Incisum	..	1	..	..	..	..	..	..	..	..	..	..
6. Punitus	..	..	3	..	3	..	..	..	..	..	..	..
Total	521	6	1374	6	767	2	92	1	243	2	272	1

CAUSES of the Deaths of the Invalids.

	Windward and Leeward Command.
Bronchitis	1

APPENDIX No. XVI.

ABSTRACT, showing the Admissions into Hospital and Deaths among the Black Troops serving in the Windward and Leeward Command, Jamaica, Honduras, and Bahamas, in the year 1861.

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations.								Honduras.		Bahamas.	
					Barbadoes.		St. Lucia.		Trinidad.		British Guiana.					
Average Strength.	536		1,007		542		98		97		270		434		381	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*																
1. Miasmatic:																
Variola	1	..	8	..	..	..	..	..	8	..	..	..	..	..	1	..
Varioloides	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..
Varicella	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..
Morbilli	..	..	46	..	43	..	1	..	2	..	..	..	7	..	44	1
Parotitis	9	..	1	..	..	..	1	..	..	..	..	..	5	..	8	..
Tonsillitis	6	..	14	..	10	..	..	..	1	..	3	..	2	..	3	..
Influenza	3	..	16	..	9	..	..	..	1	..	7	..	..	..	..	..
Ophthalmia	11	..	20	..	11	..	2	..	2	..	3	..	13	..	10	..
Furunculus	..	..	9	..	7	..	..	..	..	..	2	..	2	..	3	..
Dysenteria Acuta	3	..	10	1	5	1	..	..	4	..	1	..	1	1	12	..
„ Chron:	3	1	3	1	1	1	..	..	2	..	..	..	..	..	..	..
Diarrhœa	10	..	17	1	13	..	3	1	..	..	1	..	2	..	6	..
Febris Intermittens	94	1	31	..	11	..	..	..	12	..	7	..	273	..	40	..
„ Remittens	38	..	35	2	7	..	16	..	8	1	5	1	27	..	5	..
„ Continua	28	..	4	..	..	..	..	..	1	..	3	..	..	..	2	1
Anthrax	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Rheumat: Acutus.	8	..	36	..	28	..	1	..	1	..	8	..	30	..	10	1
„ Chron:	24	..	68	..	36	..	6	..	10	..	13	..	20	..	21	..
2. Enthetic:																
Syphilis Primaria.	60	..	70	..	58	..	5	..	1	..	11	..	8	..	18	..
„ Secundaria	8	..	10	..	7	..	1	..	..	..	2	..	2	..	3	..
Bubo	17	..	22	..	20	..	2	..	..	..	3	..	3	..	7	..
Gonorrhœa	56	..	45	..	23	..	1	..	4	..	10	..	22	..	30	..
Phymosis, &c.	3	..	5	..	4	..	..	..	..	..	..	..	..	..	..	..
Orchitis (Gon.)	3	..	6	..	7	..	..	..	1	..	1	..	3	..	2	..
Strictura Urethræ	3	..	2	..	..	..	..	..	1	..	..	..	1	..	3	..
Verrucæ	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3. Dietic:																
Scorbutus	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Ebriositas	2	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..
4. Parasitic:																
Scabies	2	..	1	..	1	..	..	..	..	..	..	..	9	..	..	..
II. *Constitutional Diseases.*																
1. Diathetic:																
Lumbago	2	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..
Anasarca	2	..	1	1	1	1	..	..	..	..	..	..	3	..	2	..
Tumores	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Tubercular:																
Scrofula	..	..	7	..	2	..	..	..	3	..	1	..	1	..	2	..
Phthisis Pulmon:	8	2	18	9	10	5	1	1	1	1	8	2	2	2	6	4
Hæmoptysis	..	1	5	..	3	..	..	..	..	..	..	..	1	..	..	..

Appendix No. XVI.—*continued.*

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations. Barbadoes.		St. Lucia.		Trinidad.		British Guiana.		Honduras.		Bahamas.	
Average Strength.	537		1,007		542		98		97		270		434		381	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
III. *Local Diseases.*																
1. Nervous:																
Encephalitis	..	..	1	1	..	..	..	..	..	..	1	1	..	..	..	..
Apoplexia	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..
Paralysis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Delirium Tremens	2	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..
Mania	..	..	2	..	2	..	..	..	..	..	..	..	2	..	..	..
Amentia	1	..	7	..	7	..	..	..	..	..	..	..	..	..	..	..
Epilepsia	1	..	4	..	2	..	..	..	..	..	2	..	..	..	1	..
Hysteria	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Cephalæa	3	..	3	..	3	..	..	..	..	..	..	..	5	..	1	..
Neuralgia	..	..	2	..	..	..	2	..	..	..	..	..	..	..	..	..
Otitis	..	..	3	..	1	..	1	..	1	..	..	..	1	..	1	..
Cæcitas	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..
2. Circulatory:																
Carditis	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Pericarditis	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Hypertroph: Cordis	..	..	1	..	..	..	..	..	..	..	..	..	3	1	..	..
Aneurisma Aortæ	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..
Aneurisma	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Varix	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Morbus cordis	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Degeneratio cordis	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
3. Respiratory:																
Laryngitis	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bronchitis Acuta	38	..	33	..	18	..	..	..	3	..	12	..	27	..	14	1
„ Chron.	16	1	8	1	2	..	5	..	..	..	1	1	7	..	4	..
Pleuritis	3	..	18	..	16	..	1	..	..	..	1	..	2	..	7	..
Pneumonia	2	..	4	1	2	1	..	..	..	..	3	..	..	..	3	1
Asthma	6	..	5	..	2	..	..	..	..	..	3	..	..	..	1	..
Epistaxis	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..
4. Digestive:																
Stomatitis	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gastritis	1	1	2	..	2	..	..	..	..	..	..	..	..	..	..	..
Obstipatio	3	..	1	..	1	..	..	..	..	..	..	..	4	..	1	..
Dyspepsia	17	..	7	..	4	..	1	..	3	..	..	..	3	..	2	..
Colica	4	1	5	..	3	..	1	..	..	..	..	..	2	..	..	..
Hernia Inguinalis	6	..	12	..	10	..	1	..	..	..	1	..	5	..	..	..
Hæmorrhois	2	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Hepatitis Acuta	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..
„ Chronica	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Ascites	3	1	..	..	..	..	..	..	..	..	..	..	2	..	..	1
5. Urinary:																
Nephritis	..	..	2	1	..	..	..	..	..	..	2	1	1	..	..	..
Ischuria	5	..	1	1	..	..	..	..	..	..	1	1	..	..	..	..
Diuresis	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Hæmaturia	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Strictura Urethræ	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..

Appendix No. XVI.—*continued.*

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations.								Honduras.		Bahamas	
					Barbadoes.		St. Lucia.		Trinidad.		British Guiana.					
Average Strength.	537		1,007		542		98		97		270		434		381	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
6. Reproductive:																
Varicocele	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Hydrocele	..	..	3	..	..	..	..	..	1	..	..	..	2	..	1	..
Orchitis (not Gon.)	9	..	12	..	7	..	1	..	2	..	3	..	5	..	11	..
7. Locomotive:																
Arthritis	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Synovitis	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Periostitis	..	..	2	..	..	..	..	..	..	..	1	..	..	..	1	..
Caries	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Necrosis	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
8. Integumentary:																
Eczema	1	..	3	..	1	..	..	..	2	..	..	..	11	..	1	..
Herpes	..	..	1	..	1	..	..	..	..	..	..	..	1	..	..	..
Psoriasis	..	..	..	..	..	..	..	..	..	..	..	..	3	..	1	..
Ecthyma	3	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..
Acne	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..
Roseola	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..
Prurigo	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Phlegmon	54	..	45	..	29	..	3	..	1	..	9	..	19	..	10	..
Abscessus	3	..	7	..	..	..	..	..	5	..	2	..	6	..	2	..
Paronychia	2	..	1	..	..	..	..	..	1	..	..	..	1	..	1	..
Ulcus	31	..	46	..	26	..	8	..	4	..	12	..	53	..	15	..
IV. *Developmental Diseases.*																
1. Atrophia	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..
IV. *Violent Deaths or Diseases.*																
1. Accidental:																
Ambustio	..	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..
Insolatio	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fractura	1	..	3	..	1	..	1	..	..	..	1	..	2	..	1	..
Contusio	18	..	44	..	26	..	4	..	6	..	8	..	6	..	6	..
Commotio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Vulnus Sclop.	2	..	2	..	3	..	..	..	..	..	1	..	2	..	1	..
„ Incisum	10	..	22	..	6	..	5	..	3	..	6	..	23	..	8	..
Luxatura	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Subluxatio	8	..	5	..	4	..	1	..	..	..	..	..	6	..	..	..
Vesiculæ Pedis	10	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Venenatio	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
4. Suicidal:																
Vulnus Incisum	..	..	1	1	..	..	..	..	..	..	1	1	..	..	..	..
6. Punitus	1	..	5	..	3	..	1	..	1	..	..	..	3	..	..	..
Total	678	10	852	21	511	9	80	2	99	2	162	8	661	7	340	10

APPENDIX No. XVII.

ABSTRACT, showing the Number of Men sent Home from the West Indies in 1861, recommended to be Discharged as Invalids, or for change of Climate.

	Windward and Leeward Command.		Jamaica.	
	For Discharge.	For Change of Climate.	For Discharge.	For Change of Climate.
Ophthalmia	1	18	..	3
Febris Intermittens	..	..	..	2
„ Remittens	..	1	..	..
Rheumatismus	..	4	1	..
Syphilis Secundaria	1	..	..	..
Anæmia	1	..	..	..
Phthisis Pulmonalis	6	3	..	..
Hæmoptysis	1	..	..	..
Mania	2	..	..	..
Amentia	1	..	..	..
Cataractes	1	..	..	..
Hypertrophia Cordis	4	..	..	..
Bronchitis	..	1	..	1
Orchitis	..	1	..	..
Synovitis	1	..	..	..
Periostitis	1	..	..	..
Necrosis	..	1	..	..
Abscessus	..	1	..	..
Fractura	..	2	..	..
Luxatura	2	..	..	..
Total	22	32	1	6

APPENDIX No. XVIII.

ABSTRACT, showing the Ages of the Troops serving in the West Indies, and the Deaths at each Age during the Year 1861.

Age	Under 20 Years.		20-24.		25-29.		30-34.		35-39.		40 and upwards.		Total.	
	Strength on 1 April.	Died during Year.	Strength on 1 April.	Died during Year.	Strength on 1 April.	Died during Year.	Strength on 1 April.	Died during Year.	Strength on 1 April.	Died during Year.	Strength on 1 April.	Died during Year.	Strength on 1 April.	Died during Year.
WHITE TROOPS:														
Royal Artillery	3	..	96	1	78	2	38	1	6	..	..	..	221	4
1st Batt. 14th Regt.	19	..	186	..	233	2	79	1	23	..	1	..	541*	3
„ „ 22nd „	11	..	403	1	327	..	72	..	43	..	8	..	864	1
Total	33	..	685	2	638	4	189	2	72	..	9	..	1,626	8
BLACK TROOPS:														
Artillery	..	..	5	..	19	..	16	..	14	..	4	..	58	..
1st West India Regt.	10	1	96	2	111	1	124	3	12	..	6	..	359	7
2nd „ „ „	54	1	149	6	140	1	48	1	46	2	1	..	438	11
3rd „ „ „	129	..	348	5	236	6	113	1	161	5	5	..	992	17
Military Labourers	10	..	78	1	33	1	22	..	22	..	9	..	174	2
Total	203	2	676	14	539	9	323	5	255	7	25	..	2,021	37

* The detachment in the Windward and Leeward Command is not included in this number, no return having been made of the ages of the men composing it.

APPENDIX No. XIX.

ABSTRACT, showing the Admissions into Hospital and Deaths among the Black Troops serving in Western Africa, in the year 1861.

Stations	Sierra Leone.		Gambia.		Gold Coast	
Strength	370		431		305	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*						
1. Miasmatic:						
Variola	..	..	14	..	..	..
Varicella	4	..	..	..	..	..
Morbilli	..	..	7	1	..	..
Tonsillitis	3	..	1	..	..	..
Influenza	..	..	..	..	1	..
Ophthalmia	3	..	7	..	10	..
Furunculus	7	..	3	..	2	..
Dysenteria Acuta	7	3	17	..	2	1
„ Chronica	..	..	..	..	2	1
Diarrhœa	3	1	2	..	3	..
Cholera Biliosa	..	..	1	1	..	..
Febris Intermittens	29	..	91	..	..	..
„ Remittens	42	..	120	..	2	1
„ Continua	..	..	1	..	..	..
Anthrax	..	..	..	..	1	..
Rheumatismus Acutus	5	..	6	1	7	..
„ Chronicus	10	..	2	..	1	..
Vaccinia	1	..	..	..	..	..
2. Enthetic:						
Syphilis Primaria	19	..	25	..	3	..
„ Secundaria	3	..	1	..	..	..
Bubo	13	..	3	..	2	..
Gonorrhœa	55	..	21	..	2	..
Phymosis. &c.	..	..	1	..	2	..
Orchitis (Gonorrhœal)	..	..	2	..	1	..
Strictura Urethræ	..	..	1	..	2	..
Ophthalmia (Gonorrhœal)	..	..	1	..	..	..
3. Dietic:						
Ebriositas	1	..	1	..	2	..
4. Parasitic:						
Scabies	9	..	..	..	..	..
Dracunculus	..	..	..	..	87	..
II. *Constitutional Diseases.*						
1. Diathetic:						
Lumbago	2	..	..	..	..	..
Anasarca	..	..	5	3	..	..
2. Tubercular:						
Phthisis Pulmonalis	5	4	9	5	1	2
Hæmoptysis	..	..	2	..	1	..
III *Local Diseases.*						
1. Nervous:						
Meningitis	..	..	..	..	1	..
Encephalitis	1	1	..	..	..	..
Apoplexia	..	..	..	1	..	1
Paralysis	1	1	1	..	..	1
Delirium Tremens	..	..	1	..	1	1
Amentia	..	..	2	..	..	..
Epilepsia	..	..	..	..	2	..
Convulsio	1	..	..	..	..	..
Cephalæa	3	..	1	..	1	..
Neuralgia	1	..	1	..	..	..
Otitis	..	..	..	..	1	..
Odontalgia	1	..	..	..	..	..
Coma	..	..	..	..	1	..

Appendix No. XIX.—*continued.*

Stations	Sierra Leone.		Gambia.		Gold Coast.	
Strength	370		431		305	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
2. Circulatory:						
Phlebitis	2	..	..	..	..	..
3. Respiratory:						
Bronchitis Acuta	18	..	27	3	6	..
„ Chronica	5	..	3	..	..	..
Pleuritis	4	..	5	..	3	..
Pneumonia	4	2	10	4	2	1
4. Digestive:						
Stomatitis	..	..	..	..	1	..
Pharyngitis	..	..	2	..	..	..
Gastritis	..	..	..	..	3	..
Obstipatio	1	..	1	..	1	..
Dyspepsia	3	..	2	..	2	..
Colica	1	..	3	..	1	..
Hepatitis Acuta	1	..	1	..	3	..
„ Chronica	1	..	..	..	1	1
Icterus	2	..	..	..	..	..
5. Urinary:						
Nephritis	..	..	1	1	..	..
Cystitis	..	..	..	..	1	..
6. Reproductive:						
Varicocele	..	..	..	..	1	..
Orchitis (not Gonorrhœal)	1	..	..	..	1	..
7. Locomotive:						
Arthritis	..	..	2	..	6	..
Synovitis	5	..	..	..	1	..
Periostitis	4	..	1	..	..	..
Exostosis	..	..	..	..	1	..
8. Integumentary:						
Eczema	..	..	1	..	..	..
Herpes	2	..	..	..	..	..
Psoriasis	..	..	2	..	1	..
Ichthyosis	..	..	..	..	1	..
Lepra	..	..	..	..	1	..
Frambœsia	..	..	..	..	3	..
Elephantiasis	..	..	..	..	1	..
Phlegmon	16	..	4	..	5	..
Abscessus	5	..	3	..	11	..
Paronychia	3	..	3	..	..	..
Ulcus	30	..	15	..	6	..
V. *Violent Deaths or Diseases.*						
1. Accidental:						
Ambustio	1	..	1	..	..	..
Insolatio	..	..	..	..	..	1
Submersio	..	..	..	..	..	1
Fractura	..	..	1	..	1	..
Contusio	4	..	13	..	5	..
Commotio	..	..	..	..	2	1
Vulnus Incisum	10	..	3	..	8	..
Subluxatio	3	..	1	..	1	..
Vesiculæ Pedis	1	..	..	..	..	..
Morsus	1	..	..	..	..	..
2. In Battle:						
Vulnus Sclopetarium	14	3	11	..	..	..
6. Punitus	4	..	4	..	1	..
Total	375	15	470	20	222	13

APPENDIX No. XX.

ABSTRACT, showing the Admissions into Hospital and Deaths among the Troops serving at St. Helena, the Cape of Good Hope, Mauritius, and Ceylon, in the year 1861.

Stations	St. Helena.		Cape of Good Hope.		Mauritius		Ceylon.			
							White.		Black.	
Strength	680		4,598		1,921		907		1,448	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*										
1. Miasmatic:										
Varicella	..	..	..	..	..	..	..	..	32	..
Morbilli	..	..	12	..	..	..	..	..	12	..
Parotitis	..	..	..	..	..	..	..	..	1	..
Tonsillitis	14	..	71	..	13	..	10	..	2	..
Influenza	..	..	2	..	8	..	1	..	2	..
Ophthalmia	28	..	552	..	26	..	119	..	81	..
Erysipelas	..	..	7	..	3	..	1	..	6	..
Furunculus	33	..	49	..	14	..	7	..	12	..
Dysenteria Acuta	4	1	37	2	124	..	84	2	23	3
„ Chronica	..	..	12	..	29	2	23	1	1	1
Diarrhœa	85	..	136	..	121	..	60	..	40	1
Cholera Biliosa	1	..	..	..	..	..	..	..	..	..
„ Spasmodica	..	..	..	..	6	4	9	3	1	..
Febris Intermittens	1	..	33	..	2	..	95	..	828	1
„ Remittens	25	..	2	..	4	..	14	..	56	1
„ Recurrens	..	..	..	..	..	..	..	..	39	..
„ Typhoides	..	..	1	..	1	1	..	..	..	..
„ Typhus	..	..	2	..	..	..	..	..	..	..
„ Continua	68	2	217	4	40	1	33	..	124	..
Anthrax	1	..	4	..	..	..	1	..	..	..
Rheumatismus Acutus	10	..	120	..	11	..	44	..	64	..
„ Chronicus	11	..	78	..	15	..	16	..	12	..
Vaccinia	..	..	1	..	..	..	..	..	..	..
2. Enthetic:										
Syphilis Primaria	15	..	306	..	33	..	80	..	5	..
„ Secundaria	10	..	116	..	2	..	18	..	2	..
Iritis Syphilitica	..	..	2	..	..	..	..	..	..	..
Bubo	5	..	100	..	19	..	30	..	10	..
Gonorrhœa	32	..	275	..	19	..	65	..	9	..
Phymosis, &c.	..	..	2	..	5	..	..	..	3	..
Orchitis (Gonorrhœal)	2	..	45	..	..	..	13	..	4	..
Strictura Urethræ	2	..	16	..	1	..	..	..	1	..
Verrucæ	..	..	2	..	..	..	..	..	..	..
3. Dietic:										
Scorbutus	..	..	..	..	6	..	3	..	..	..
Ebriositas	51	1	68	2	25	1	17	..	3	..
4. Parasitic:										
Porrigo	..	..	1	..	1	..	..	..	1	..
Scabies	..	..	48	..	11	..	..	..	92	..
Tænia Solium	..	..	5	..	..	..	..	..	..	..
Ascaris Lumbricoides	..	..	..	..	1	..	..	..	..	..
Dracunculus	..	..	..	..	2	..	..	..	..	..
Vermes	1	..	..	..	..	..	..	..	..	..

Appendix No. XX.—*continued.*

Stations	St. Helena.		Cape of Good Hope.		Mauritius		Ceylon. White.		Ceylon. Black.	
Strength	680		4,598		1,921		907		1,448	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
II. *Constitutional Diseases.*										
1. Diathetic:										
Lumbago	1	..	1	..	2	..	..	..	..	..
Anæmia	..	..	6	..	..	..	1	..	..	..
Anasarca	..	..	1	1	..	..	2	..	..	1
Carcinoma	1	1	..	..	..	..	..	..	..	..
Tumores	..	..	..	..	1	..	..	..	1	..
Lupus	..	..	..	..	..	..	1	..	1	..
4. Tubercular:										
Scrofula	..	..	12	..	2	..	..	..	2	..
Morbus Coxarius	..	..	1	..	..	..	..	..	..	..
Phthisis Pulmonalis	1	..	19	5	6	2	9	2	2	1
Hæmoptysis	1	..	6	..	..	..	2	..	1	..
III. *Local Diseases.*										
1. Nervous:										
Meningitis	..	..	..	..	..	..	1	..	..	..
Encephalitis	..	..	1	1	..	..	..	..	..	..
Myelitis	..	..	2	..	..	..	1	..	..	..
Apoplexia	..	1	1	2	..	..	..	..	2	2
Paralysis	5	..	10	..	1	1	3	..	1	..
Delirium Tremens	2	1	43	4	2	..	11	1	..	..
Mania	..	..	3	..	4	..	..	..	..	..
Amentia	10	..	7	..	..	..	3	..	2	..
Epilepsia	..	..	3	..	9	..	4	..	1	..
Convulsio	2	..	..	..	..	..	..	..	..	..
Cephalæa	..	..	31	..	5	..	10	..	2	..
Neuralgia	..	..	5	..	2	..	1	..	1	..
Dysecœa	1	..	..	..	1	..	..	..	..	..
Otitis	4	..	9	..	19	..	9	..	4	..
Cæcitas	..	..	..	..	..	..	3	..	1	..
Odontalgia	5	..	1	..	..	..	..	..	..	..
Polypus Auris	1	..	..	..	..	..	..	..	..	..
2. Circulatory:										
Carditis	..	..	24	..	..	..	1	..	..	..
Pericarditis	..	..	6	..	..	..	1	..	..	..
Hypertrophia cordis	..	..	11	..	5	..	4	..	..	..
Aneurisma Aortæ	..	..	2	1	..	..	..	..	..	..
Aneurisma	..	..	..	..	..	..	..	1	..	..
Morbus Valv. Cordis	2	..	..	..	5	2	..	..	..	..
Phlebitis	..	..	1	..	..	..	..	..	..	..
Varix	1	..	10	..	..	..	3	..	1	..
Palpitatio cordis	..	..	18	..	2	..	..	..	..	..
Morbus „	..	..	22	4	..	..	..	..	..	..
Angina pectoris	..	..	1	..	..	..	..	..	..	..
3. Respiratory:										
Laryngitis	..	..	5	..	..	..	..	..	..	..
Bronchitis Acuta	32	1	164	1	33	..	56	..	32	1
„ Chronica	..	..	66	..	8	..	8	..	8	..
Pleuritis	..	..	7	..	1	..	2	..	4	..
Pneumonia	..	..	21	4	6	1	..	..	1	..
Apoplexia Pulmonalis	..	..	..	2	..	..	..	..	..	..

Appendix No. XX.—*continued.*

Stations	St. Helena.		Cape of Good Hope.		Mauritius		Ceylon. White.		Ceylon. Black.	
Strength	680		4,598		1,921		907		1,448	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Asthma	1	..	3	..	..	..	2	..	6	..
Epistaxis	2	..	3	..	..	..	..	..	..	..
Emphysema	2	..	..	..	..	..	..	..	..	..
4. Digestive:										
Glossitis	..	..	1	..	..	..	..	..	..	..
Stomatitis	..	..	..	..	1	..	..	..	2	..
Pharyngitis	1	..	..	..	..	..	..	..	..	..
Gastritis	1	..	5	..	..	..	1	..	..	..
Enteritis	1	..	..	..	..	..	..	..	..	..
Peritonitis	..	..	2	1	3	2	2	1	..	..
Obstipatio	5	..	13	..	13	..	2	..	10	..
Dyspepsia	19	..	93	1	17	..	17	..	..	..
Colica	9	..	27	..	27	..	15	..	26	..
Hæmatemesis	..	..	2	..	..	..	..	..	..	..
Hernia Inguinalis	..	..	11	..	4	..	1	..	5	..
Hæmorrhois	4	..	18	..	12	..	4	..	1	..
Fistula in ano	..	..	2	..	1	..	2	..	..	..
Hepatitis Acuta	3	..	9	1	11	2	54	1	3	..
„ Chronica	3	..	8	2	4	1	49	1	1	1
Congestio Hepatis	..	..	..	..	29	..	..	..	..	..
Icterus	5	..	9	..	2	..	..	..	1	..
5. Urinary:										
Nephritis	..	..	..	..	..	..	2	..	..	..
Ischuria	..	..	1	..	..	..	1	..	..	..
Hæmaturia	1	..	1	..	..	..	1	..	..	..
Lithiasis	..	..	2	..	..	..	..	..	..	..
Cystitis	..	..	1	..	..	..	..	..	..	..
Enuresis	3	..	2	..	3	..	4	..	..	..
Morbus Prostaticus	..	..	1	..	..	..	..	..	..	..
6. Reproductive:										
Varicocele	..	..	4	..	..	..	2	..	..	..
Hydrocele	..	..	8	..	..	..	..	..	2	..
Orchitis (not Gonorrhœal)	1	..	45	..	25	..	22	..	20	..
7. Locomotive:										
Arthritis	1	..	5	..	1	..	2	1	..	..
Synovitis	..	..	9	..	7	..	3	..	..	..
Contractura	..	..	1	..	2	..	..	..	..	..
Periostitis	..	..	8	..	6	..	..	..	1	..
8. Integumentary System:										
Urticaria	2	..	1	..	..	..	..	..	2	..
Eczema	1	..	1	..	12	..	..	..	2	..
Herpes	1	..	4	..	6	..	1	..	5	..
Impetigo	..	..	12	..	..	..	..	..	..	..
Psoriasis	1	..	5	..	3	..	..	..	4	..
Lichen	..	..	..	..	1	..	..	..	..	..
Acne	..	..	1	..	..	..	1	..	..	..
Rupia	..	..	2	..	..	..	..	..	..	..
Ecthyma	2	..	4	..	..	..	..	..	..	..
Roseola	..	..	1	..	..	..	..	..	..	..
Pemphigus	..	..	..	..	1	..	..	..	..	..
Phlegmon	3	..	132	..	57	..	38	..	76	..

Appendix No. XX.—*continued.*

Stations	St. Helena.		Cape of Good Hope.		Mauritius		Ceylon. White.		Ceylon. Black.	
Strength	680		4,598		1,921		907		1,448	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Abscessus	17	..	72	..	29	..	3	..	19	..
Paronychia	2	..	21	..	15	..	2	..	3	..
Ulcus	12	..	156	..	72	..	48	..	79	..
IV. *Developmental Diseases.*										
1. Atrophia	..	..	2	..	14	..	15	..	3	..
V. *Violent Deaths or Diseases.*										
1. Accidental:										
Ambustio	1	..	11	..	6	..	1	..	1	..
Explosio	..	..	4	..	..	..	2	..	1	..
Insolatio	1	..	5	..	..	..	..	..	..	..
Submersio	1	..	..	5	..	1	..	1	..	..
Fractura	2	..	16	..	9	..	1	..	1	..
Contusio	59	..	216	..	31	..	58	..	79	..
Commotio	..	..	..	..	1	..	1	..	..	..
Vulnus Sclopetarium	..	..	1	..	..	..	..	..	..	..
„ Incisum	16	..	88	..	52	..	18	..	37	..
Subluxatio	26	..	57	..	11	..	37	..	7	..
Vesiculæ Pedis	24	..	7	..	19	..	2	..	2	..
Venenatio	1	..	..	..	1	..	2	..	3	..
Morsus Hominis	2	..	..	..	..	..	..	..	..	..
4. Suicidal:										
Vulnus Sclopetarium	..	..	..	..	..	1	..	..	..	..
„ Incisum	..	..	..	1	..	..	..	..	1	1
Fractura	..	..	..	..	1	1	..	..	..	..
6. Punitus	1	..	19	..	2	..	4	..	3	..
Simulatio morbi	..	..	..	..	1	..	..	..	..	..
Diseases not specified	..	..	..	..	..	..	7	..	..	..
General Total	705	8	3974	44	1168	23	1306	15	1939	14

CAUSES of the Deaths of the Invalids.

	Cape.	Ceylon.
Dysenteria Chronica	..	1
Syphilis Secundaria	..	1
Phthisis Pulmonalis	2	..
Paralysis	..	1
Total	2	3

APPENDIX No. XXI.

ABSTRACT, showing the Ages of the Troops serving at the Cape of Good Hope, and the Deaths at each Age, during the Year 1861.

	Under 20 Years.		20-24.		25-29.		30-34.		35-39.		40 and upwards.		Total.	
	Strength on April 1.	Deaths.	Strength on April 1.	Deaths.	Strength on April 1.	Deaths.	Strength on April 1.	Deaths.	Strength on April 1.	Deaths.	Strength on April 1.	Deaths.	Strength on April 1.	Deaths.
Royal Engineers ..	3	..	79	1	87	1	30	1	8	..	8	..	215	3
2nd Batt., 10th Foot.	160	..	451	4	132	1	48	..	13	..	4	1	808	6
2nd „ 13th „ .	170	..	514	4	63	3	61	..	14	..	3	..	825	7
85th Foot	12	..	268	2	234	..	167	1	58	2	10	2	749	7
Cape Mounted Rifles.	206	2	171	1	212	1	163	1	51	..	12	..	815	5
Total	551	2	1,483	12	728	6	469	3	144	2	37	3	3,412	28

APPENDIX XXII.

RETURN, showing the Admissions into Hospital and Deaths among the Troops serving in Australia, New Zealand, and China, during the year 1861.

Stations	Australia.		New Zealand.		South China.				North China.			
					White.		Black.		White.		Black.	
Strength	907		4,890		3,022		2,890		3,113		238	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*												
1. Miasmatic:												
Variola	..	..	..	..	..	..	2	..	15	2	..	..
Varicella	..	..	..	..	..	..	7	..	..	..	..	..
Morbilli	2	..	..	..	1	..	..	..	..	..	..	..
Parotitis	1	..	4	..	1	..	1	..	..	..	1	..
Tonsillitis	10	..	57	..	56	..	3	..	46	..	1	..
Influenza	14	..	158	..	6	..	37	..	..	..	..	..
Ophthalmia	21	..	215	..	304	..	37	..	202	..	..	..
Erysipelas	1	..	3	..	2	..	3	..	2	1	..	..
Furunculus	10	..	37	..	21	..	9	..	1	..	5	..
Dysenteria Acuta	4	1	23	5	64	9	215	15	183	26	24	..
„ Chronica	..	..	6	..	12	2	7	..	39	9	..	..
Diarrhœa	75	..	241	..	398	8	253	23	724	21	9	..
Cholera Biliosa	..	..	..	..	1	..	6	1	10	7	1	..
Febris Intermittens	6	..	80	..	750	1	1,713	..	221	5	49	..
„ Remittens	..	..	..	..	56	9	30	8	22	..	..	..
„ Typhoides	..	..	8	2	1	2	1	..	1	1	..	..
„ Typhus	..	..	..	..	..	..	..	..	2	..	..	..
„ Continua	30	1	99	2	1,106	7	74	5	561	28	1	..
Anthrax	..	..	4	..	3	..	..	..	3	..	..	..
Rheumatismus Acutus.	22	..	132	..	80	..	140	1	92	..	11	1
„ Chron:	37	..	94	..	120	..	118	..	57	..	3	..
Pertussis	1	..	..	..	..	..	..	..	..	..	..	..
2. Enthetic:												
Syphilis Primaria	17	..	14	..	566	..	63	1	204	..	15	..
„ Secundaria	6	..	38	..	69	..	21	..	15	..	2	..
Iritis Syphilitica	..	..	2	..	..	..	..	..	1	..	..	..
Bubo	15	..	16	..	247	..	44	1	82	..	4	..
Gonorrhœa	53	..	68	..	545	..	39	1	359	..	10	..
Phymosis, &c.	3	..	1	..	2	..	4	..	3	..	2	..
Orchitis (Gonorrhœal)	2	..	7	..	101	..	22	..	71	..	3	..
Strictura Urethræ	6	..	10	..	13	..	4	..	5	..	..	..
Verrucæ	2	..	10	..	1	..	..	..	3	..	..	..
3. Dietic:												
Scorbutus	3	..	..	..	1	..	2	..	..	..	..	..
Purpura	..	..	1	..	..	..	..	..	..	..	..	..
Ebriositas	28	..	45	7	172	1	2	..	63	1	..	..
4. Parasitic:												
Porrigo	..	..	6	..	1	..	..	..	1	..	..	..
Scabies	..	..	67	..	10	..	26	..	4	..	..	..
Tænia Solium	..	..	1	..	1	..	2	..	21	..	..	..
Ascaris Lumbricoides	..	..	1	..	4	..	5	..	..	..	..	..
Dracunculus	..	..	2	..	..	..	6	..	..	..	..	..
Aphthæ	1	..	..	..	1	..	..	..	..	..	..	..
Vermes	2	..	..	..	7	..	2	..	21	..	..	..

Appendix No. XXII.—*continued.*

Stations	Australia.		New Zealand.		South China.				North China.			
					White.		Black.		White.		Black.	
Strength	907		4,890		3,022		2,890		3,113		238	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
II. *Constitutional Diseases.*												
1. Diathetic:												
Lumbago	1	..	17	..	2	..	18	..	2	..	3	..
Anasarca	2	1	1	..	2	..	24	1	3	..	1	..
Ischias	..	..	..	..	..	..	..	..	3	..	..	..
2. Tubercular:												
Scrofula	2	..	11	..	5	..	3	..	3	..	..	..
Phthisis Pulmonalis	12	1	27	13	8	..	3	3	12	9	1	..
Hæmoptysis	4	..	14	1	8	..	1	..	3	..	..	..
III. *Local Diseases.*												
1. Nervous System:												
Meningitis	1	1	..	..	1	..	..	..	..	..	..	..
Encephalitis	1	1	..	..	..	..	..	..	..	..	..	..
Apoplexia	..	..	..	..	2	2	..	..	3	3	..	..
Paralysis	6	..	3	..	9	2	5	1	..	..	..	..
Delirium Tremens	11	1	13	1	22	3	2	..	27	1	..	..
Mania	6	1	..	..	5	..	1	..	3	..	..	..
Amentia	2	..	9	1	4	..	..	..	4	..	..	..
Epilepsia	2	..	17	2	5	..	1	..	4	2	..	..
Cephalæa	1	..	20	..	10	..	6	..	26	..	1	..
Neuralgia	1	..	11	..	..	..	16	..	10	..	..	..
Dysecœa	..	..	5	..	2	..	1	..	..	..	..	..
Otitis	..	..	15	..	17	..	10	..	11	..	..	..
Amaurosis	..	..	3	..	..	..	..	..	..	..	..	..
Sclerotitis	..	..	1	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	1	1	..	..
Odontalgia	..	..	..	..	..	..	6	..	1	..	..	..
Convulsio	..	..	..	..	2	..	..	..	..	..	..	..
Rabies	..	..	..	..	..	..	..	..	1	1	..	..
2. Circulatory System:												
Angina Pectoris	1	..	..	..	..	..	..	..	..	..	..	..
Carditis	..	..	..	..	6	..	..	..	1	..	..	..
Pericarditis	..	..	..	..	1	..	1	1	3	..	..	..
Hypertrophia cordis	8	..	7	..	4	..	..	..	..	..	..	..
Aneurisma	2	..	1	1	1	..	..	..	..	..	..	..
Varix	6	..	12	..	1	..	..	..	5	..	..	..
Morbus Cordis	..	..	5	2	..	..	..	..	..	4	..	..
Syncope	..	..	1	..	2	..	1	..	..	..	..	..
Morbus Valv. Cordis	1	..	..	..	3	..	..	..	13	..	..	..
Phlebitis	..	..	..	..	1	..	..	..	..	..	..	..
3. Respiratory System:												
Laryngitis	..	..	..	..	1	..	..	..	..	..	..	..
Bronchitis Acuta	34	..	212	..	115	2	128	4	358	3	16	..
„ Chronica	7	..	47	..	63	..	30	1	18	1	..	..
Pleuritis	1	1	29	..	8	..	5	..	7	..	..	..
Empyema	..	..	1	..	..	..	..	..	..	..	..	..
Pneumonia	1	..	15	2	9	2	7	2	43	5	1	..

Appendix No. XXII.—*continued.*

Stations	Australia.		New Zealand.		South China.				North China.			
					White.		Black.		White.		Black.	
Strength	907		4,890		3,022		2,890		3,113		238	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Asthma	..	..	1	1	3	..	18	2	3	..	..	..
Epistaxis	..	..	2	..	..	..	..	..	..	..	1	..
4. Digestive System:												
Gastritis	1	1	3	..	..	..	1	..	..	..	..	..
Enteritis	..	..	..	..	..	..	1	..	..	..	..	..
Peritonitis	..	..	1	..	2	..	..	..	2	..	..	..
Obstipatio	1	..	9	..	6	..	4	..	1	..	1	..
Dyspepsia	10	..	50	..	42	..	28	..	74	..	2	..
Colica	4	..	24	..	58	..	47	..	37	..	2	..
Hæmatemesis	..	..	..	..	4	1	..	..	1	..	..	..
Hernia	..	..	..	..	14	..	7	..	3	..	..	..
„ Inguinalis	1	..	5	..	..	..	..	..	..	..	..	..
Hæmorrhois	9	..	26	..	34	..	17	1	16	..	3	..
Fistula in ano	..	..	2	..	8	..	3	..	3	..	..	..
Splenitis	..	..	..	..	20	..	1	..	..	..	..	..
Hepatitis Acuta	1	..	9	..	62	2	9	..	61	5	1	..
„ Chronica	..	..	11	2	58	1	3	..	15	2	..	..
Icterus	2	..	11	..	19	2	5	..	49	..	3	..
Ascites	..	..	..	..	3	1	..	..	2	..	..	..
5. Urinary System:												
Nephritis	1	..	2	..	1	..	4	..	2	..	..	..
Nephria	1	..	..	..	..	..	..	..	..	..	..	..
Ischuria	1	..	3	1	..	..	1	..	..	..	..	..
Diuresis	..	..	1	..	..	..	..	..	..	..	..	..
Hæmaturia	..	1	3	..	1	..	..	..	1	..	..	..
Cystitis	..	..	..	..	1	..	..	..	..	..	..	..
Enuresis	2	..	..	..	1	..	..	..	3	..	..	..
Calculus Vesicæ	..	..	..	..	..	..	1	..	..	..	..	..
6. Reproductive Syst.:												
Varicocele	..	..	1	..	2	..	..	..	1	..	..	..
Hydrocele	..	..	..	..	1	..	1	1	3	..	..	..
Orchitis (not Gon:)	2	..	28	..	22	..	..	..	17	..	..	..
Sarcocele	1	..	..	..	..	..	..	..	1	..	..	..
7. Locomotive Syst.:												
Arthritis	..	..	1	..	..	..	..	..	2	..	..	..
Synovitis	..	..	6	..	8	..	..	..	2	..	..	..
Contractura	2	..	..	..	1	..	..	..	3	..	..	..
Periostitis	2	..	3	..	4	..	2	..	..	..	..	..
Exostosis	..	..	..	..	1	..	..	..	..	..	..	..
Caries	1	..	1	..	..	..	1	..	1	..	..	..
Necrosis	1	..	..	..	1	..	..	..	1	..	..	..
Atrophia musculorum	..	..	..	..	4	..	..	..	..	..	..	..
8. Integumentary Syst.:												
Urticaria	..	..	3	..	5	..	..	..	..	..	..	..
Eczema	4	..	13	..	1	..	..	..	4	..	..	..
Herpes	2	..	8	..	3	..	..	..	6	..	2	..
Impetigo	..	..	..	..	..	..	..	..	1	..	..	..

Appendix No. XXII.—*continued.*

Stations	Australia.		New Zealand.		South China.				North China.			
					White.		Black.		White.		Black.	
Strength	907		4,890		3,022		2,890		3,113		238	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Psoriasis	..	..	5	..	5	..	59	..	8	..	3	..
Lichen	..	..	..	..	..	..	..	..	1	..	..	..
Mentagra	..	..	1	..	..	..	..	..	..	..	..	..
Acne	..	..	1	..	..	..	..	..	..	..	..	..
Prurigo	..	..	1	..	..	..	..	..	..	..	..	..
Ecthyma	..	..	..	..	1	..	..	..	..	..	..	..
Lepra	1	..	1	..	3	..	..	..	..	..	..	..
Phlegmon	36	..	153	..	260	..	50	..	107	..	6	..
Abscessus	8	..	50	..	21	..	23	..	4	..	2	..
Paronychia	..	..	21	..	4	..	4	..	18	..	..	..
Ulcus	7	..	138	1	64	..	40	..	74	..	6	..
IV. *Developmental Diseases.*												
1. Atrophia	..	..	2	..	55	..	46	12	..	..	1	1
V. *Violent Deaths or Diseases.*												
1. Accidental:												
Ambustio	..	..	22	..	1	..	12	..	19	..	..	..
Gelatio	..	..	..	..	11	..	1	..	3	..	..	..
Insolatio	..	..	..	..	11	1	..	1	59	18	..	..
Submersio	..	..	..	8	..	1	..	..	..	..	..	..
Fractura	9	1	18	1	13	..	2	..	7	..	1	..
Amputatio	..	..	..	..	..	..	..	..	1	1	..	..
Contusio	58	..	210	..	151	..	96	1	70	..	34	..
Commotio	1	..	..	..	..	..	..	..	..	..	..	..
Vulnus Sclopetarium	12	..	3	..	9	..	4	..	1	..	..	..
„ Incisum	17	..	58	..	72	..	31	..	30	..	1	..
Luxatura	1	..	5	..	..	..	1	..	5	..	1	..
Subluxatio	9	..	102	..	76	..	11	..	40	..	2	..
Vesiculæ Pedis	6	..	16	..	6	..	10	..	..	..	1	..
2. In Battle:												
Prœlio Occisi	..	..	..	10	..	..	..	..	..	..	..	..
Vulnus Incisum	..	..	2	..	..	..	..	..	..	..	..	..
„ Sclopetarium	..	..	51	5	..	..	..	..	..	..	..	..
3. Homicidal:												
Homicidium	..	..	..	..	..	1	..	..	..	..	..	..
6. Punitus	2	..	20	..	10	..	1	..	21	..	4	..
Diseases not specified	16	..	16	..	4	..	5	..	23	2	..	..
Total	717	12	3,070	68	6,209	60	3,717	87	4,405	159	241	2

Appendix XXII.—*continued.*

CAUSES of the Deaths of the Invalids.

	Australia.	China.
Dysenteria Chronica	..	3
Diarrhœa	..	3
Syphilis Secundaria	..	3
Anasarca	..	2
Phthisis Pulmonalis	..	3
Aneurisma	1	..
Hepatitis Chronica	..	2
Nephria	1	..
Vulnus Sclopetarium..	..	1
Disease not specified	..	1
Total	2	18

APPENDIX No. XXIII.

ABSTRACT, showing the Ages of the Men serving in China, and the Deaths in each Quinquennial Period of Life, during the Year 1861.

	Under 20.		20-24.		25-29.		30-34.		35-39.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
31st Regiment ..	7	..	476	10	377	14	246	10	61	2	14	2
67th „ ..	142	1	448	27	187	22	224	15	49	5	..	..
99th „ ..	147	1	631	10	300	8	100	5	60	..	7	1
Total	296	2	1,555	47	864	44	570	30	170	7	21	3

APPENDIX No. XXIV.

ABSTRACT, showing the Admissions into Hospital and Deaths among Her Majesty's Troops serving in Bengal, Madras, and Bombay, during the year 1861.

Stations	Bengal.		Madras.		Bombay.	
Average Strength	37,483		10,739		8,860	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*						
1. Miasmatic:						
Variola	203	30	4	1	19	4
Varicella	6	..	1	..	..	..
Morbilli	11	..	1	..	10	..
Scarlatina	2	2	1	..	..	..
Diphtheria	..	..	1	..	..	..
Parotitis	12	..	3	..	..	..
Tonsillitis	682	1	89	..	207	..
Influenza	298	..	26	..	42	..
Cynanche Trachealis	1	..	..	..	..	..
Coryza	..	..	36	..	72	..
Ophthalmia	2,639	..	320	..	611	..
Erysipelas	75	2	15	1	12	..
Furunculus	318	..	32	..	18	..
Dysenteria Acuta	2,288	141	729	15	547	39
„ Chronica			131	4		
Diarrhœa	5,669	57	724	7	954	11
Cholera Spasmodica	1,423	880	70	29	48	35
Febris Intermittens	14,268	35	1,096	..	3,724	5
„ Remittens	3,168	39	273	6	451	12
„ Typhoides	24	10	2	2	1	..
„ Typhus	4	..	4	1	..	..
„ Continua	7,750	76	1,184	4	1,076	8
„ Ephemera	..	..	58	..	154	..
Rheumatismus Acutus	2,894	3	456	..	625	..
„ Chronicus			290	..		..
Anthrax	6	..	..	..	4	..
Vaccinia	10	..	4	..	..	..
2. Enthetic:						
Syphilis Primaria	5,693	1	931	..	1,173	..
„ Secundaria	1,147	9	293	1	285	3
Cachexia Syphiloidæa	1	1	..	..	..	..
Iritis Syphilitica	58	..	11	..	15	..
Ulcus Penis	32	..	37	..	42	..
Bubo	1,478	..	561	..	423	..
Gonorrhœa	4,482	..	696	..	952	..
Phymosis, &c.	58	..	11	..	6	..
Orchitis (Gonorrhœal)	453	..	196	..	82	..
Ophthalmia (Gonorrhœal)	1	..	..	..	..	..
Strictura Urethræ	102	3	29	..	31	..
Verrucæ	42	..	23	..	26	..
3. Dietic:						
Scorbutus	43	..	..	..	18	..
Purpura	54	..	..	..	2	1
Ebriositas	256	..	155	1	85	..
Bronchocele	1	..	..	..	..	..
Rachitis	1	..	..	..	..	..

Appendix No. XXIV.—*continued.*

Stations	Bengal.		Madras.		Bombay.	
Average Strength	37,483		10,739		8,860	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
4. Parasitic:						
Porrigo	9	..	2	..	2	..
Scabies	25	..	26	..	16	..
Tænia Solium	41	..	6	..	49	..
Vermes	137	..	26	..	1	..
Ascaris Lumbricoides	..	..	..	..	1	..
Dracunculus	15	..	29	..	32	..
Aphthæ	3	..	..	..	..	..
II. *Constitutional Diseases.*						
1. Diathetic:						
Podagra	4	..	2	..	..	..
Lumbago	45	..	3	..	16	..
Anæmia	90	3	8	..	9	..
Anasarca	27	2	7	2	8	1
Tumores	11	..	10	..	11	..
Scirrhoma	1	..	1	..	..	..
Carcinoma	2	1	..	..	..	..
2. Tubercular:						
Scrofula	80	..	58	..	33	..
Phthisis Pulmonalis	251	65	93	8	43	11
Hæmoptysis	83	4	13	..	17	..
Abscessus Psoanus	17	2	..	..	..	..
Morbus Coxarius	1	..	..	..	..	..
III. *Local Diseases.*						
1. Nervous System:						
Meningitis	4	4	..	..	2	1
Encephalitis	..	..	3	..	1	..
Apoplexia	46	24	7	6	9	3
Paralysis	47	4	19	2	18	2
Delirium Tremens	131	15	43	1	35	4
Mania	53	1	10	..	4	..
Amentia	83	1	29	..	22	..
Epilepsia	140	2	32	..	21	..
Convulsio	8	1	4	..	..	..
Vertigo	3	..	..	..	..	..
Hysteria	9	..	2	..	..	..
Cephalæa	197	2	87	..	50	1
Neuralgia	96	..	27	..	26	..
Dysecœa	35	..	4	..	5	..
Otitis	326	..	72	..	68	..
Polypus Nasi	1	..	1	..	3	..
Odontalgia	3	..	1	..	2	..
Cæcitas	3	..	..	..	..	..
Amaurosis	..	..	..	..	7	..
Hemeralopia	..	..	..	..	6	..
Nyctalopia	..	..	..	..	1	..
Pterygium	..	..	..	..	1	..
Fistula Lachrymalis	..	..	..	..	1	..
Rabies	2	1	..	..	1	1
2. Circulatory System:						
Carditis	53	3	33	..	29	..
Endocarditis	5	..	..	..	..	..
Pericarditis	39	2	6	..	5	1
Hypertrophia Cordis	49	5	77	5	22	2
Atrophia Cordis	..	1	..	..	..	..

Appendix No. XXIV.—*continued.*

Stations	Bengal.		Madras.		Bombay.	
Average Strength	37,483		10,739		8,860	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Morbus Valv. Cordis	117	3	..	..	..	..
Angina Pectoris	12	..	..	..	1	..
Palpitatio Cordis	94	..	6	..	..	..
Syncope	9	..	2	..	6	..
Aneurisma Aortæ	..	1	2	2	..	1
Aneurisma	8	1	..	..	2	..
Ruptura Aortæ	..	..	..	1	..	..
Varix	29	..	8	..	6	..
Nævus	3	..	..	..	..	..
Phlebitis	1	..	2	..	..	..
3. Respiratory System:						
Laryngitis	14	..	2	..	4	..
Bronchitis Acuta	1,616	13	422	2	419	4
„ Chronica			36	..		
Pleuritis	193	3	33	1	24	1
Hydrothorax	1	1	..	..	..	..
Pneumonia	155	27	18	3	24	3
Asthma	30	1	15	..	11	..
Dyspnœa	..	..	1	..	1	..
Emphysema	5	..	2	..	3	..
Epistaxis	23	..	1	..	1	..
4. Digestive System:						
Glossitis	3	..	2	..	..	..
Stomatitis	11	..	1	..	3	..
Pharyngitis	11	..	3	..	4	..
Gastritis	37	7	8	..	1	..
Enteritis	17	2	2	..	3	..
Peritonitis	17	5	7	..	3	2
Obstipatio	158	..	42	..	16	..
Dyspepsia	848	1	340	1	154	1
Colica	668	1	78	..	154	..
Ileus	8	..	1	1	..	..
Hæmatemesis	11	..	..	..	3	..
Hernia	50	..	13	..	11	..
Hæmorrhois	421	..	92	..	70	..
Fistula in Ano	44	1	5	..	12	..
Prolapsus Ani	..	..	6	..	..	..
Splenitis	308	2	28	..	42	..
Hepatitis Acuta	2,214	93	436	23	438	30
„ Chronica			196	5		
Icterus	262	..	62	1	56	1
Chololithus	2	..	1	..	..	..
Ascites	22	2	2	..	4	..
Melæna	..	..	1	..	1	..
5. Urinary System:						
Nephritis	36	..	3	1	6	..
Nephria	9	4	7	..	1	..
Ischuria	11	..	6	..	7	..
Diuresis	21	..	..	..	..	..
Hæmaturia	4	..	2	..	2	..
Lithiasis	3	..	..	..	2	..
Cystitis	11	..	2	1	..	..
Fistula in Perineo	..	..	1	1	..	..
Enuresis	6	..	4	..	6	..
Calculus	1	..	..	..	..	..
Diabetes	1	..	..	..	..	..

Appendix No. XXIV.—*continued.*

Stations	Bengal.		Madras.		Bombay.	
Average Strength	37,483		10,739		8,860	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
6. Reproductive System:						
Varicocele	17	..	4	..	5	..
Hydrocele	17	..	18	..	4	..
Orchitis (not Gonorrhœal) ..	500	1	96	..	95	..
Spermatorrhœa	1	..	1	..	..	..
Hypospadias	..	..	1	..	..	..
7. Locomotive System:						
Arthritis	33	..	4	..	3	..
Synovitis	71	..	9	..	14	..
Hydrarthrus	1	..	..	..	..	..
Contractura	13	..	2	..	3	..
Periostitis	66	..	14	..	17	..
Exostosis	14	..	..	..	1	..
Caries	12	..	8	..	3	..
Necrosis	7	..	2	..	9	..
Curvatura Spinalis	3	..	1	..	..	..
Malformatio Pedis	1	..	..	..	..	..
8. Integumentary System:						
Roseola	1	..	..	..	..	..
Urticaria	23	..	1	..	4	..
Eczema	59	..	18	..	12	..
Herpes	92	..	36	..	16	..
Impetigo	14	..	6	..	3	..
Psoriasis	56	..	26	..	15	..
Lichen	7	..	3	..	..	..
Pemphigus	..	..	1	..	..	..
Rupia	3	..	1	..	1	..
Ecthyma	..	..	1	..	..	..
Acne	5	..	6	..	..	..
Prurigo	1	..	2	..	..	..
Pityriasis	1	..	1	..	..	..
Tinea	..	..	2	..	..	..
Icthyosis	1	..	..	..	..	..
Lepra	6	..	4	..	1	..
Clavus	..	..	1	..	..	..
Morbus Cutis	1	..	..	..	..	..
Condylomata	20	..	..	..	..	..
Phlegmon	1,874	..	566	..	445	..
Abscessus	260	2	63	..	26	1
Paronychia	126	..	52	..	42	..
Epulis	..	..	4	..	..	..
Ulcus	1,458	..	328	..	335	..
IV. *Developmental Diseases.*						
4. Diseases of Nutrition						
Atrophia	288	5	47	1	44	..
V. *Violent Deaths or Diseases.*						
1. Accidental:						
Ambustio	17	..	10	..	11	..
Explosio	1	..	1	..	..	..
Ictus Fulminis	..	..	..	..	3	2
Insolatio	13	4	9	3	13	2
Submersio	..	9	..	9	..	6
Fractura	68	..	39	1	16	1
Amputatio	3	1	2	..	5	..
Contusio	745	..	416	..	441	..

Appendix No. XXIV.—*continued.*

Strength	Bengal.		Madras.		Bombay.	
Average Strength	37,483		10,739		8,860	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Commotio	..	..	1	..	4	1
Vulnus	45	1	..	..	..	..
„ Sclopetarium	23	2	4	..	4	1
„ Incisum	96	..	147	..	71	..
Luxatura	28	..	9	..	14	..
Subluxatio	333	..	213	..	144	..
Vesiculæ Pedis	59	..	12	..	4	..
Venenatio	..	..	3	..	10	..
Morsus Serpentis	..	..	2	..	3	..
„ Canis	1	..	..	..	..	..
„ Simiæ	1	..	1	..	..	..
„ Equi	..	..	..	..	1	..
Not specified—returned as "Accidental"	1,336	7	..	..	..	..
2. In Battle	1	..	..	..	..	..
4. Suicidal:						
Suicidium	7	3	..	..	..	..
Vulnus Incisum	..	..	..	1	..	1
„ Sclopetarium	..	3	..	..	..	..
5. Executio:						
Suspendium	..	..	..	..	..	1
6. Punitus	39	..	8	..	11	..
Diseases not specified	12	2	130	2	3	..
Total	73,233	1,642	13,471	156	15,649	204

Causes of the Deaths of the Invalids.

	Bengal.	Madras.	Bombay.
Dysenteria	18	2	7
Diarrhœa	..	1	..
Febris Remittens	1	..	..
Syphilis Secundaria	..	3	2
Phthisis Pulmonalis	23	5	6
Apoplexia	1	..	..
Paralysis	1	..	..
Morbus Valv: Cordis	4	1	..
Aneurisma	1	..	..
Pneumonia	1	..	..
Bronchitis	1	..	..
Hepatitis	7	..	..
Ascites	2	..	..
Nephria	2	..	..
Debilitas	1	..	..
Diseases not specified	3	2	..
Total	66	14	15

APPENDIX No. XXV.

ABSTRACT, showing the Diseases of the Men invalided from Madras and Bombay in 1861, for Discharge from the Service and for Change of Climate.

Stations	Madras.		Bombay.	
Mean Strength	10,739		8,860	
Diseases.	Recommended for		Recommended for	
	Discharge.	Change of Climate.	Discharge.	Change of Climate.
I. *Zymotic Diseases.*				
1. Miasmatic:				
Ophthalmia..	..	2	10	12
Dysenteria	..	26	1	27
Diarrhœa	1	6	2	3
Febris Intermittens ..	1	1	1	3
„ Remittens	..	..	..	1
„ Continua	..	..	..	2
Rheumatismus	53	29	20	9
2. Enthetic:				
Syphilis Secundaria ..	1	9	6	9
Cachexia Syphiloidæa ..	2	3	..	..
Iritis Syphilitica	..	..	..	1
Strictura Urethræ	..	3	..	..
3. Dietic:				
Scorbutus	..	1	..	..
II. *Constitutional Diseases.*				
1. Diathetic:				
Beri Beri	..	1	..	..
2. Tubercular:				
Scrofula	5	2	1	2
Phthisis Pulmonalis ..	5	18	3	8
Hæmoptysis	..	1	1	1
III. *Local Diseases.*				
1. Nervous System:				
Apoplexia	..	..	1	..
Paralysis	..	4	1	1
Mania .. .. }	4	3	11	3
Amentia .. .. }				
Epilepsia	5	2	2	2
Cephalæa	2	4	1	1
Neuralgia	..	1	..	..
Dysecœa	..	..	3	1
Otitis	..	1	..	..
Amaurosis	..	..	1	2
Cæcitas	1	..	..	..
Pterygium	..	..	..	1
2. Circulatory System:				
Carditis	3	5	1	4
Pericarditis..	..	1	..	..
Hypertrophia Cordis ..	..	..	4	1
Degeneratio „ ..	4	5	..	..
Morbus Valv: „ ..	2	9	..	2
Aneurisma	..	..	2	..
Varix	3	1	1	..
Palpitatio	1	..	..	1

Appendix No. XXV.—*continued.*

Stations	Madras.		Bombay.	
Mean Strength	10,739		8,860	
Diseases.	Recommended for		Recommended for	
	Discharge.	Change of Climate.	Discharge.	Change of Climate.
3. Respiratory System:				
Aphonia	1	..	..	..
Bronchitis	2	11	1	8
Pleuritis	..	1	..	..
Pneumonia	..	1	1	..
Asthma et Dyspnœa	..	1	2	1
4. Digestive System:				
Obstipatio	..	7	..	..
Hernia	2	1	6	2
Hæmorrhois	..	2	..	..
Fistula in Ano	1	2	..	..
Splenitis	..	1	2	1
Hepatitis	1	54	7	29
Ascites	..	..	..	1
5. Urinary System:				
Diabetes	..	1	..	..
6. Reproductive System:				
Varicocele	1	..	..	..
Hydrocele	1	..	..	..
Orchitis (not Gonorrhœal)	..	2	..	1
7. Locomotive System:				
Synovitis	..	1	..	2
Contractura	1	1	1	..
Ostitis	..	1	..	..
Caries	1	..	..	..
Necrosis	..	..	2	1
Curvatura Spinalis	1	..	..	..
8. Integumentary Syst.:				
Phlegmon	..	..	..	1
Paronychia	..	..	2	..
Ulcus	3	3	1	..
IV. *Developmental Diseases.*				
4. Diseases of Nutrition:				
Atrophia et Debilitas	1	6	4	6
V. *Violent Deaths or Diseases.*				
1. Accidental:				
Ambustio	1	..	..	..
Fractura	..	1	..	..
Amputatio	2	..	1	..
Vulnus Incisum	1	..	..	..
Luxatura	..	..	2	..
Worn out	30	4	..	..
Total	143	239	105	150

APPENDIX No. XXVI.

ABSTRACT, showing the Ages of the Troops serving in the Madras Command, and the Deaths at each Age, during the Year 1861.

Age	Under 20 Years.		20-24.		25-29.		30-34.		35-39.		40 and upwards.		Total.	
Corps.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.
Royal Artillery	10	..	190	2	112	4	49	3	9	..	..	..	370	9
1st Dragoon Guards	127	1	263	5	196	5	53	7	49	2	16	2	704	22
17th Lancers	12	..	351	5	213	4	55	1	6	..	13	1	650	11
1st Batt. 1st Foot	31	1	465	4	302	5	132	1	42	2	7	..	979	13
1st „ 18th „	35	1	479	11	318	6	110	3	45	2	2	..	989	23
43rd Foot	25	..	319	1	335	2	143	2	121	2	26	..	969	7
3rd Batt. 60th Foot	8	..	579	6	269	9	64	4	11	2	3	..	934	21
66th Foot	8	1	487	3	321	3	151	3	58	1	11	..	1,036	11
68th „	3	..	427	4	457	3	146	3	70	1	9	..	1,112	11
69th „	122	..	410	1	206	2	204	3	65	3	3	..	1,010	9
74th „	221	..	240	4	230	2	104	5	113	3	24	..	932	14
91st „	126	..	391	3	329	6	133	2	79	3	32	..	1,090	14
Total	728	4	4601	49	3288	51	1344	37	668	21	146	3	10,775	165

APPENDIX No. XXVII.

ABSTRACT, showing the Ages of the Troops serving in the Bombay Command, and the Deaths at each Age, during the year 1861.

Age	Under 20 Years.		20-24.		25-29.		30-34.		35-39.		40 and upwards.		Total.	
Corps.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.	Strength.	Deaths.
13th Brig., Royal Artillery	16	1	135	5	268	7	64	5	19	2	..	..	502	20
3rd Dragoon Guards	2	..	230	6	255	11	86	9	64	3	16	1	653	30
6th Dragoons	6	..	361	6	209	2	89	2	22	1	15	..	702	11
1st Batt. 4th Foot	220	1	349	7	197	3	94	1	53	..	20	..	933	12
28th Foot	109	1	455	9	260	11	172	8	26	6	4	2	1026	37
33rd „	17	..	468	2	370	1	58	1	64	..	14	..	991	4
56th „	57	..	430	16	225	12	158	14	55	8	11	1	936	51
72nd „	92	..	463	4	258	7	105	3	48	1	2	..	968	15
83rd „	12	..	350	5	303	3	202	2	88	2	10	..	965	12
95th „	171	3	434	7	287	4	88	4	12	..	1	..	993	18
Total	702	6	3675	67	2632	61	1116	49	451	23	93	4	8669	210

APPENDIX No. XXVIII.

ABSTRACT, showing the cases of Sickness and Deaths among Troops on board ship, proceeding on Foreign Service.

Stations	India and China.		Cape of Good Hope.		Mediterranean.		Australian Colonies.		British America.	
Number of Men Embarked	2,498		1,484		2,795		1,082		11,807	
Average Annual Strength	755		292		91		294		623	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*										
1. Miasmatic:										
Tonsillitis	7	..	13	..	2	..	9	..	30	..
Influenza	1	..	14	..	..	..	4	..	24	..
Ophthalmia	8	..	13	..	..	..	7	..	8	..
Erysipelas	..	..	3	..	..	..	1	..	4	..
Furunculus	7	..	13	..	2	..	2	..	2	..
Dysenteria Acuta	10	2	1	..	..	..	..	..	3	..
„ Chronica	2	..	..	..	..	..	..	..	1	..
Diarrhœa	30	..	13	..	1	..	2	..	6	..
Cholera Biliosa	2	..	..	..	..	..	..	..	..	..
Febris Intermittens	4	..	4	..	1	..	2	..	1	..
„ Remittens	..	..	..	..	..	..	1	..	..	..
„ Continuua	19	..	8	..	4	..	7	..	8	..
Anthrax	1	..	..	..	..	..	1	..	2	..
Rheumatismus Acutus	12	..	11	..	..	..	7	..	10	..
„ Chronicus	6	..	6	..	1	..	4	..	7	..
2. Enthetic:										
Syphilis Primaria	15	..	55	..	5	..	16	..	84	..
„ Secundaria	13	..	9	..	4	..	7	..	5	..
Iritis Syphilitica	..	..	..	..	..	..	1	..	2	..
Ulcus Penis	..	..	..	..	..	..	..	..	2	..
Bubo	14	..	14	..	2	..	7	..	22	..
Gonorrhœa	26	..	34	..	1	..	8	..	36	..
Phymosis, &c.	..	..	..	..	..	..	2	..	..	..
Orchitis (Gonorrhœal)	2	..	3	..	..	..	2	..	8	..
Strictura Urethræ	..	..	..	..	..	..	3	..	..	..
3. Dietic:										
Scorbutus	3	..	2	..	..	..	..	..	..	..
4. Parasitic:										
Porrigo	..	..	4	..	..	..	..	..	..	..
Scabies	2	..	15	..	..	..	12	..	1	..
Tænia Solium	1	..	..	..	..	..	..	..	..	..
II. *Constitutional Diseases.*										
1. Diathetic:										
Lumbago	..	..	1	..	..	..	..	..	..	..
Anasarca	1	..	..	..	..	..	1	..	..	..
Cachexia	1	..	..	..	..	..	..	..	..	..

Appendix No. XXVIII.—*continued.*

Stations	India and China.		Cape of Good Hope.		Mediterranean.		Australian Colonies.		British America.	
Number of Men Embarked	2,498		1,484		2,795		1,082		11,807	
Average Annual Strength	755		292		91		294		623	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
2. Tubercular:										
Scrofula	3	..	..	..	..	..	..	..	1	..
Phthisis Pulmonalis ..	2	..	1	..	..	..	..	..	1	..
Hæmoptysis	..	..	1	..	..	..	2	..	..	..
III. *Local Diseases.*										
1. Nervous System:										
Apoplexia	..	..	..	..	..	..	..	..	1	1
Mania	2	..	..	..	..	..	..	..	..	..
Amentia	..	..	..	..	..	..	..	..	1	..
Epilepsia..	..	..	1	..	..	..	1	..	3	..
Cephalæa	..	..	..	..	..	..	..	..	2	..
Neuralgia	2	..	..	..	..	..	2	..	..	..
Otitis	..	..	1	..	..	..	4	..	..	..
Sea Sickness	6	..	..	..	..	..	2	..	13	..
Vertigo	3	..	..	..	..	..	..	..	1	..
2. Circulatory System:										
Aneurisma Aortæ ..	..	..	..	..	..	1	..	..	..	..
Varix	..	..	..	..	..	..	..	..	1	..
Morbus Cordis ..	..	..	..	1	..	..	..	..	..	..
Syncope	..	..	..	..	..	..	..	..	6	..
3. Respiratory System:										
Bronchitis Acuta ..	18	..	2	..	1	..	9	..	28	..
„ Chronica ..	1	..	2	..	1	..	..	..	2	..
Pleuritis	2	..	1	..	..	..	1	..	3	..
Pneumonia	2	1	1	..	..	..	..	..	8	..
4. Digestive System:										
Gastritis	..	..	..	..	..	..	..	..	1	..
Obstipatio	..	..	..	..	..	..	..	..	7	..
Dyspepsia	18	..	22	..	..	..	4	..	20	..
Colica	8	..	..	..	..	..	2	..	4	..
Hæmatemesis	..	..	..	..	..	..	2	..	..	..
Hernia Inguinalis ..	..	..	..	..	..	..	..	..	1	..
Hæmorrhois	2	..	4	..	..	..	..	..	1	..
Hepatitis Acuta ..	..	..	..	..	2	..	..	..	1	..
„ Chronica ..	1	..	..	..	..	..	..	..	..	..
Icterus	3	1	..	..	1	..	2	..	3	..
5. Urinary System:										
Diuresis	..	..	..	..	..	..	1	..	..	..
Enuresis	..	..	..	..	..	..	1	..	..	..
6. Reproductive System:										
Orchitis (not Gonorrhœal)	2	..	..	..	.	..	3	..	..	..
7. Locomotive System:										
Synovitis..	..	..	1	..	..	..	1	..	..	..
Periostitis	..	..	..	..	..	..	2	..	..	..
Necrosis	1	..	..	..	..	..	..	..	..	..

Appendix No. XXVI II.—*continued.*

Stations	India and China.		Cape of Good Hope.		Mediterra-nean.		Australian Colonies.		British America.	
Number of Men Embarked	2,498		1,484		2,795		1,082		11,807	
Average Annual Strength	755		292		91		294		623	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
8. Integumentary Syst:										
Eczema	1	..	2	..	..	..	..	..	1	..
Herpes	..	..	2	..	1	..	..	..	..	..
Impetigo	..	..	3	..	..	..	..	..	..	..
Psoriasis	5	..	1	..	..	..	2	..	..	..
Ecthyma	..	..	..	..	..	..	..	..	1	..
Phlegmon	28	..	16	..	5	..	17	..	28	..
Abscessus	10	..	7	..	..	..	1	..	8	..
Paronychia	1	..	7	..	2	..	1	..	1	..
Ulcus	6	..	12	..	1	..	9	..	11	..
Phagedæna	1	..	..	..	..	..	..	..	..	..
IV. *Developmental Diseases.*										
4. Diseases of Nutrition:										
Atrophia	4	..	..	..	..	..	2	..	2	..
V. *Violent Deaths or Diseases.*										
1. Accidental:										
Ambustio	1	..	3	..	1	..	4	..	3	..
Insolatio	1	1	..	..	..	..	..	..	..	..
Submersio	1	1	..	..	..	..	..	..	..	..
Fractura	3	..	3	..	1	..	1	..	9	..
Contusio	16	..	13	..	5	..	10	..	8	..
Commotio	3	..	..	..	..	..	..	..	..	..
Vulnus Incisum	14	..	6	..	1	..	3	..	10	..
Luxatura	..	..	1	..	..	..	..	..	1	..
Subluxatio	5	..	..	..	1	..	3	..	11	..
4. Suicidal:										
Submersio	1	1	..	..	..	..	..	..	..	..
6. Punitus	3	..	..	..	..	..	1	..	..	..
Total	367	7	349	1	46	1	199	..	469	1

APPENDIX No. XXIX.

ABSTRACT, showing the cases of Sickness and Deaths among Troops on board ship returning from Foreign Service.

Stations	India and China.		Cape of Good Hope.		Mediterranean.	
Number of Men Embarked	5,942		950		1,127	
Average Annual Strength	2,194		135		23	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*						
1. Miasmatic:						
Variola	2	..	..	..	..	..
Tonsillitis	27	..	3	..	..	..
Influenza	10	..	..	..	1	..
Ophthalmia	90	..	108	..	1	..
Erysipelas	2	..	..	..	..	..
Furunculus	9	..	1	..	..	..
Dysenteria Acuta	126	12	6	..	..	..
„ Chronica	20	6	..	..	..	..
Diarrhœa	235	2	3	..	2	..
Cholera Biliosa	3	..	..	..	..	..
„ Spasmodica	29	14	..	..	..	..
Febris Intermittens	176	..	8	..	..	..
„ Remittens	23	..	..	..	..	..
„ Continua	67	3	5	..	..	..
Rheumatismus Acutus	69	..	2	..	..	..
„ Chronicus	32	..	3	..	..	..
2. Enthetic:						
Syphilis Primaria	58	.	3	..	..	..
„ Secundaria	49	..	5	..	..	..
Bubo	22	..	1	..	1	..
Gonorrhœa	64	..	5	..	..	..
Phymosis, &c.	3	..	..	..	..	..
Orchitis (Gonorrhœal)	13	..	..	..	..	..
Strictura Urethræ	4	..	..	..	..	..
Ulcus Penis	3	..	..	..	..	..
3. Dietic:						
Scorbutus	13	..	..	..	..	..
Ebriositas	1	1	..	..	..	..
4. Parasitic:						
Scabies	1	..	..	..	..	..
Ascaris Lumbricoides	2	..	..	..	..	..
II. *Constitutional Diseases.*						
1. Diathetic:						
Anæmia	1	..	..	..	..	..

Appendix No. XXIX.—*continued.*

Stations	India and China.		Cape of Good Hope.		Mediterranean.	
Number of Men Embarked	5,942		930		1,127	
Average Annual Strength	2,194		135		23	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
2. Tubercular:						
Scrofula	3	..	..	..	..	..
Phthisis Pulmonalis	6	4	..	1	..	..
Hæmoptysis	2	..	..	..	..	..
III. *Local Diseases.*						
1. Nervous System:						
Meningitis	1	..	1	..	..	..
Apoplexia	2	1	..	..	..	..
Paralysis	1	1	1	..	..	..
Delirium Tremens	2	1	..	..	..	..
Mania	1	..	..	..	..	..
Amentia	2	..	..	..	..	..
Cephalæa	6	..	..	..	..	..
Neuralgia	2	..	..	..	..	..
Otitis	11	..	..	..	..	..
Encephalitis	1	1	..	..	..	..
2. Circulatory System:						
Pericarditis	2	..	..	..	..	..
Hypertrophia cordis	..	..	1	..	..	..
3. Respiratory System:						
Laryngitis	2	..	..	..	..	..
Bronchitis Acuta	57	1	4	..	3	..
„ Chronica	1	..	..	..	1	..
Pleuritis	6	..	1	..	..	..
Pneumonia	6	1	..	..	..	..
4. Digestive System:						
Enteritis	1	1	..	..	..	..
Obstipatio	8	..	3	..	..	..
Dyspepsia	36	..	5	..	..	..
Colica	19	..	2	..	..	..
Hernia Inguinalis	2	..	..	..	..	..
Hæmorrhois	8	..	..	..	..	..
Splenitis	1	..	..	..	..	..
Hepatitis Acuta	18	..	2	..	..	..
„ Chronica	8	3	1	..	..	..
Icterus	13	..	..	..	..	..
Ascites	..	..	1	..	..	..
5. Urinary System:						
Nephritis	2	..	..	..	..	..
Enuresis	3	..	..	..	..	..
6. Reproductive System:						
Varicocele	1	..	..	..	..	..
Hydrocele	2	..	..	..	..	..
Orchitis (not Gonorrhœal)	9	..	1	..	..	..

Appendix No. XXIX.—*continued.*

Stations	India and China.		Cape of Good Hope.		Mediterranean.	
Number of Men Embarked	5,942		930		1,127	
Average Annual Strength	2,194		135		23	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
7. Locomotive System:						
Synovitis	3	..	..	..	..	..
Periostitis	1	..	..	..	..	..
Caries	1	..	..	..	..	..
8. Integumentary System:						
Eczema	2	..	..	..	..	..
Herpes	2	..	..	..	..	..
Impetigo	1	..	..	..	..	..
Psoriasis	2	..	..	..	..	..
Lepra	1	..	..	..	..	..
Acne	1	..	..	..	..	..
Phlegmon	35	..	4	..	..	..
Abscessus	24	1	..	..	..	..
Paronychia	16	..	..	..	..	..
Ulcus	75	..	9	..	..	..
IV. *Developmental Diseases.*						
4. Diseases of Nutrition:						
Atrophia	2	..	..	..	..	..
V. *Violent Deaths or Diseases.*						
1. Accidental:						
Ambustio	18	..	..	..	..	..
Insolatio	4	..	..	..	..	..
Submersio	..	2	..	..	..	..
Fractura	6	..	1	..	..	..
Contusio	51	..	4	..	..	..
Commotio	2	..	..	..	..	..
Vulnus Incisum	16	..	..	..	..	..
Luxatura	2	..	..	..	..	..
Subluxatio	14	..	1	..	..	..
Vesiculæ Pedis	1	..	..	..	..	..
Morsus Simiæ	..	..	1	..	..	..
6. Punitus	2	..	..	..	..	..
Diseases not specified	6	..	..	..	..	..
Total	1,687	55	196	1	9	..

APPENDIX XXX.

ABSTRACT, showing the cases of Sickness and Deaths among Troops on shipboard proceeding from one Colony or Station to another.

Stations	China to Mauritius and India.		India to New Zealand.		Other Stations.	
Number of Men Embarked	1,302		1,000		2,666	
Average Annual Strength	223		213		135	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*						
1. Miasmatic:						
Variola	..	..	..	..	1	..
Tonsillitis	2	..	1	..	5	..
Ophthalmia	58	..	5	..	1	..
Erysipelas	..	..	1	..	..	..
Furunculus	..	..	5	..	..	..
Dysenteria Acuta	11	..	3	2	..	..
„ Chronica	..	..	1	..	..	..
Diarrhœa	12	..	16	2	4	..
Cholera Biliosa	..	..	9	9	..	..
„ Spasmodica	..	..	24	14	..	..
Febris Intermittens	30	..	18	..	1	..
„ Remittens	..	..	..	..	1	..
„ Continua	127	1	..	..	5	1
Rheumatismus Acutus	6	..	6	..	4	..
„ Chronicus	3	..	..	..	..	..
2. Enthetic:						
Syphilis Primaria	19	..	10	..	15	..
„ Secundaria	3	..	..	..	2	..
Bubo	3	..	16	..	1	..
Gonorrhœa	17	..	4	..	5	..
Phymosis, &c.	..	..	1	..	..	..
Orchitis (Gonorrhœal)	7	..	..	..	1	..
Strictura Urethræ	1	..	..	..	1	..
3. Dietic:						
Scorbutus	2	..	..	..	..	..
Ebriositas	..	..	..	..	1	..
4. Parasitic:						
Tænia Solium	..	..	1	..	..	..
II. *Constitutional Diseases.*						
1. Diathetic:						
Anasarca	1	1	..	..	..	..
Tumores	..	..	..	..	1	..
2. Tubercular.						
Scrofula	1	..	1	..	..	..
Phthisis Pulmonalis	1	..	1	..	..	..
Hæmoptysis	..	..	1	..	..	..

Appendix No. XXX.—*continued.*

Stations	China to Mauritius and India.		India to New Zealand.		Other Stations.	
Number of Men Embarked	1,302		1,000		2,666	
Average Annual Strength..	223		213		135	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
III. *Local Diseases.*						
1. Nervous System:						
Paralysis	..	..	1	..	..	..
Epilepsia	..	..	1	..	..	..
Neuralgia	..	..	4	..	..	..
Otitis	..	..	1	..	..	..
3. Respiratory System:						
Bronchitis Acuta	19	..	20	1	10	..
„ Chronica	2	..	4	..	..	..
Asthma	..	..	..	..	1	..
4. Digestive System:						
Dyspepsia	..	..	1	..	..	..
Colica	1	..	..	..	..	..
Hernia Inguinalis	..	..	..	..	2	..
Hæmorrhois	..	..	1	..	2	..
Splenitis	3	..	..	..	..	..
Hepatitis Acuta	3	..	..	..	..	..
„ Chronica	2	1	4	..	..	..
Icterus	1	..	1	..	..	..
6. Reproductive System:						
Orchitis (not Gonorrhœal)	4	..	1	..	..	..
7. Locomotive System						
Synovitis	1	..	..	..	..	..
8. Integumentary System:						
Phlegmon	20	..	3	..	1	..
Abscessus	2	..	1	..	4	..
Ulcus	9	..	8	..	6	..
IV. *Developmental Diseases.*						
4. Diseases of Nutrition:						
Atrophia	3	..	4	..	..	..
V. *Violent Deaths or Diseases.*						
1. Accidental:						
Ambustio	..	..	1	..	..	..
Fractura	1	..	..	..	..	..
Contusio	6	..	5	..	4	..
Vulnus Incisum	2	..	1	..	5	..
Subluxatio	1	..	..	..	..	..
Total	384	3	186	28	84	1

APPENDIX

SUMMARY OF METEOROLOGICAL OBSERVATIONS made at Tien-Tsin, north of Surgeon,

Latitude 39° 9′ N. Longitude

Year and Month.	Reading of Barometer.					Temperature of Air in Month.						Mean Temperature.	
									Mean.				
	Mean.	Mean Daily Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Of all Highest.	Of all Lowest.	Daily Range.	Air.	Dew-point.
1860.	in.	in.	in.	in.	in.	°	°	°	°	°	°	°	°
Dec.* ..	30·267	·127	30·731	29·643	1·088	50·0	3·0	47·0	36·7	20·5	16·2	29·0	21·6
1861.													
January.	30·391	·090	30·700	30·130	·570	38·0	-0·8	38·8	28·9	10·5	18·4	21·1	3·1
February	30·398	·109	30·649	30·090	·559	46·0	-1·5	47·8	33·3	14·3	19·1	24·3	10·8
March ..	30·168	·116	30·548	29·659	·889	68·0	18·0	50·0	54·3	29·9	24·4	42·4	28·6
April†..	29·941	·117	30·286	29·517	·769	87·0	35·0	52 0	73·4	45·5	27·9	60·7	37·7
May	29·759	·123	30·165	29·372	·793	94·0	41·0	53·0	82·0	55 0	27·0	67·6	48·9
June....	29·656	·103	29·888	29·381	·507	107·0	53·0	54·0	93·3	65·5	27·8	78·8	58·7
July....	29·569	·071	29·737	29·335	·402	108·0	61·0	47·0	96·6	73·6	23·0	85·5	70·3
August..	29·646	·063	29·925	29·369	·556	100·0	60·5	39·5	90·2	69·7	20·5	81·5	68·3
Sept. ...	29·925	·094	30·229	29·596	·633	92·0	40·0	52·0	78·3	56·6	21·7	69·1	56·0
October.	30·085	·091	30·349	29·755	·594	77·0	37·0	40·0	69·8	45·4	24·4	59·9	46·2
Nov. ...	30·166	·117	30·462	29·816	·646	68·0	24·0	44·0	52·3	33·7	18·6	44·8	35·2
Dec.‡ ..	30·387	·098	30·631	30·060	·571	45·0	1·0	44·0	34·1	15·3	18·8	26·4	18·3
Mean...	30·008	·099	30·297	29·673	·624	77·5	30·7	46·8	65·5	42·9	22·6	55·2	40·2
1862.													
January.	30·484	·089	30·683	30·316	·367	41·0	-0·5	41·5	31·9	10·1	21·8	23·7	5·5
February	30·359	·146	30·681	29·984	·697	56·0	1·0	55·0	40·5	13·8	26·7	30·8	9·7

* Wind not registered. † Wind not registered

No. XXXI.

China, from December 1860, to February 1862, inclusive, by Dr. Lamprey, 67th Regiment.

117° 16′ E. Height above the sea 25 feet.

Vapour.			Mean degree of Humidity Saturation = 100.	Mean Weight of a Cubic foot of Air.	Mean Reading of Thermometer.		Wind.					Mean Amount of Ozone.	Mean Amount of Cloud.	Rain.	
Elastic Force.	In a cubic foot of Air.				Maximum in Rays of Sun.	Minimum on Grass.	Estimated Strength.	Relative Proportion of						Number of Days it Fell.	Amount Collected.
	Mean.	Short of Saturation.						N.	E.	S.	W.				
in.	grs.	grs.		grs.	°	°									in.
·115	1·4	0·5	73	574	..	..	..	..	..	..	..	..	..	2	0·420*
·050	0·6	0·8	45	587				6	7	6	3	2·1		2	0·103
·070	0·8	0·7	53	583				6	2	11	1	6·6		3	0·380
·159	1·8	1·4	59	557				13	4	8	1	3·9		5	0·785
·226	2·5	3·4	42	533				8	1	12	3	3·0		2	0·300
·348	3·8	3·6	51	522				6	0	8	2	4·1		8	2·585†
·496	5·3	5·2	51	508				3	0	12	12	2·2		6	1·795
·742	7·8	5·2	61	499				6	3	13	7	1·5		7	1·035
·692	7·4	4·1	64	505				14	2	5	10	1·6		11	6·750
·450	4·9	2 9	63	523				14	4	8	3	1·1		7	2·520
·313	3·5	2·3	60	536				5	2	10	11	1·3		1	0·400
·205	2·3	0·7	69	554				11	1	7	6	0·7		3	1·460
·100	1·2	0·5	70	580				13	0	6	2	1·2		2	0·200‡
·321	3·5	2·6	57	541				8·7	2·2	8·8	5·0	2·4		4·7	1·526
·055	0·7	0·8	44	585				26	1	1	2	0·9		1	0·020
·073	0·8	1·3	42	574				19	1	3	5	0·3		0	0

Not Recorded. Not Recorded. Not Recorded. Not Recorded.

on thirteen days.

‡ Wind not registered on seven days.

REPORT

OF THE

SANITARY BRANCH FOR 1861.

BY

T. G. LOGAN, M.D.,

INSPECTOR-GENERAL OF HOSPITALS AND HEAD OF THE SANITARY BRANCH.

TO THE DIRECTOR-GENERAL

OF THE

ARMY MEDICAL DEPARTMENT.

Sir,

I have the honour to submit to you the Sanitary Divisional Report of the Army Medical Department for the year 1861.

In the corresponding document of the preceding year, the descriptive details and Sanitary conditions of the Barracks and Hospitals of the Home Quarters of the Army were represented so fully as to have exhausted the subject so far as regards the necessity of any very extended Report thereon for the present occasion; the course of the year under review not having been characterised by the execution of any generally applied Sanitary works of a primary importance, although progress was made in the fulfilment of the recommendations of the Barrack and Hospital Improvement Commission, at various Stations, and commensurately with the financial means afforded by the Government grant for the period.

The observations on the Foreign Stations of the Army will be found collated in considerable detail from the local documents, and, in one or two desirable instances, the Reports of the Principal Medical Officers are given in full.

It is again a subject of regret that the Documents of the year, for the Bengal Presidency, were not received opportunely to have come, more appropriately, under report within this volume; but a compensation has been obtained in a concise and interesting Topographical and Sanitary Sketch of the Districts forming the area of the Bengal Command, by Staff Surgeon Dr. Crawford, and in which are contained notices of such general improvements for the welfare of the Troops, to the latest, as the means in possession of this Department have afforded opportunity of offering.

Amongst the contributions to this Departmental Volume, the Review of the Progress of Hygiene, by Professor Dr. Parkes, F.R.S., is replete with interesting information.

A Paper on Typhoid Fever in India, its clinical characters, morbid anatomy, and etiological relations, by Dr. Hanbury, Sur-

geon 33rd Regiment, will be perused with an advantage and, although it here appears as a reprint from a local journal, its excellence in the light of Sanitary Science may well be brought under the general cognisance of the Officers of the Department.

Dr. Inglis, Deputy Inspector-General of Hospitals (late Surgeon-Major 64th Foot), has afforded a valuable special Report on the Station of Kurrachee, where are the best of Indian Barracks (of pre-Mutiny era), and the salutary results of an effective system of Sanitary police in maintaining an unwonted state of health of his Corps, there, are strongly evidenced by him.

Dr. Munro, Surgeon 93rd Highlanders, has furnished a special Topographical and Sanitary Report on Subathoo, a lower Himalayan Station, or, more definitely, an intermediate hill site between the plains of the N.W. Provinces of India and the elevated position of Simla, or that of the Convalescent Depôt at Landour.

Dr. Scot's (79th Highlanders) Topographical and Sanitary Report on the Cantonment of Meean Meer (Lahore) follows. At the time it was written it bore augury of Sanitary evil through a cesspit system of conservancy which, it is but too probable, played no small accessory part in the deadly epidemic of Cholera which visited the European Troops there in 1861, and which led to the researches of a Special Commission, whose Report is not yet published.

The results of the first year's working of the Sanatorium at Citta Vecchia, Malta, are recorded in Surgeon-Major Mr. Matthew's Special Report of the Establishment.

The series of contributed Papers concludes with two of scientific research; one on "Carniset," a concentrated Food, by the Professors of the Army Medical School; the other on the "Ventilation" of the New Hut Barracks at Gravesend, by Assistant-Surgeon Mr. Hewlett, of the Bombay Army, and Staff Assistant-Surgeons Messrs. St. John Stanley, and Baynes Reed, of the British Medical Department.

I have the honour to be,

Sir,

Your most obedient servant,

T. G. LOGAN,

Inspector-General of Army Hospitals.

6, *Whitehall Yard,*
June 1863.

THE HOME QUARTERS OF THE ARMY.

THE CAMP OF ALDERSHOT.

The regimental Sanitary Reports of the year under review, submitted by the medical officers of corps which, contemporaneously or in succession of the reliefs, were quartered in the camp, reiterate very much the account of the routine of ordinary duties and of the occasions of the greater operations of military instruction, in their bearing on the health of the men; they give the particulars of barrack and hospital accommodation in the permanent buildings and hut structures; they state the cooking means, the conveniences for personal cleanliness, the conservancy arrangements of latrines, urinals, &c., that were enlarged upon in the General Report of this Department for the preceding year, and they afford little novel or additional matter to specify on these points on the present occasion.

The salubrity of Aldershot as a position for troops continued without question, and the most ordinary averages as to sick in hospital prevailed generally throughout the seasons; whilst, in especial instances, one medical officer cites the fact of only 4 per cent. having been the mean ratio of total sick to well in his corps, and another, in tribute to the salutary influences which here combine to raise and maintain the health of the troops, reports the marked improvement in the general physical condition of his regiment after a change from a station of the Western District, Devonport, to the more invigorating atmosphere of Aldershot.

The Reports, in aggregate, tend to show that in the permanent barracks the troops enjoyed ample averages of 800 to 1,000 cubic feet per man, although in the huts more than three-fourths of the regulated measurement (the 400 cubic feet laid down by the Royal Sanitary Commission) was rarely afforded.

The duties at this camp, in their general influences, were in no wise detrimental to the health of the corps severally at any season of this year; although, in the training of the young soldiers, individual physical endurance may have on occasions been over-taxed, in having to keep position in the ranks throughout the longer and wider evolutions over country on the great field-days of instruction.

A range of five to seven and nine consecutive nights, per man, in bed to one on guard, as the reports show, may be assumed to have had an important bearing in contributing to favourable results in the year's statistics of health in the camp.

The working of the Commissariat agency for the rations supplied to the troops continued to form an express subject of a general satisfaction.

The hospital accommodation underwent no important change or any material extension from the conditions detailed in the Report of the previous year, and no prevalence of disease necessitated resort to overcrowding in the wards at any time.

Five hundred and 600 cubic feet per patient formed, variously, the available averages of space in the ordinary hospital huts; generally 700 and 800 were afforded in the "New" huts; and, in the permanent building, termed the "Union" Hospital, the averages varied in regard of regiments, some corps obtaining an average amount of 1,000 cublic feet a patient, others less than that by 200 and 300 cubic feet, thus according to the numbers of their respective sick lists.

The sanitary arrangements of the Camp were systematically carried out, and under vigilant supervision. The only evil relative hereto, which reached any considerable magnitude, was an offensive state of some of the drains, in the North Camp more particularly, in the autumn, so palpable at the time

of a prevalence of fever, and of diarrhœa, verging upon choleraic degree, that the medical officers pronounced the cause of these diseases to be in direct measure attributable to this evil in immediate existence. Upon official representation no delay took place in looking into the condition of the drains in question. They were found to be in an obstructed state, and the following stringent Division Order was issued:—

"*Assistant Adjutant-General's Office, Aldershot, September 3rd*, 1861.

"Complaints having been made of the bad smells arising from the drains in both Camps, and in the permanent barracks, and there being a consequent apprehension of disease, the Lieutenant-General Commanding calls upon officers commanding brigades, regiments, and corps, to lend him their best assistance in abating a nuisance which will infallibly be productive of serious results to the health of the troops, unless an immediate remedy be applied.

"The Commanding Royal Engineer reports that the principal cause of this evil is the improper use of the drains.

"The Lieutenant-General therefore directs that no solid matter whatever, such as tea-leaves, potato-parings, &c., is, on any account, to be thrown into any of the drains.

"The troops are to be careful to separate the solid from the liquid refuse; the solid is to be thrown into the ash-pits, and all the liquid whatever down the urinals or foul-water drains.

"In order that there may be no misapprehension as to which are foul drains, the traps have been, or will be, painted red, and the Commanding Royal Engineer will, upon the application of the commanding officer of any regiment, send competent persons to point out which are the foul drains, so that the troops can plead no excuse of ignorance.

"The surface drains being intended to carry off the rain as it falls, nothing whatever, whether liquid or solid, is to be thrown upon or into them.

"The Lieutenant-General will visit any disregard of this Order, in the case of women, the wives of soldiers, by depriving them and their families of the indulgence of living in barracks, or, in the case of soldiers, by severe punishment; and, although reluctant to impose additional duties upon the troops, will be compelled further to place extra sentries to stop this practice, which is utterly inexcusable, as there is scarcely a hut or room not within fifty yards of a foul drain.

"The Lieutenant-General also cautions the troops against throwing the water on the parades and roads near the gratings, by which means the ground round them becomes saturated, offensive, and injurious to the health of the troops.

"The Lieutenant-General also reminds the troops that they will be subjected to heavy damages for the cleansing of the drains and cesspits if, after this Order, they are found to have neglected it.

"This Order is to be read to the troops at the three first general parades after its receipt."

Water Supply.—In the autumn the purity of the water from the wells in the North and South Camps became a question, and as to possible contamination by percolation from adjacent latrines, &c., through the ready permeability of the soil.

Fourteen different samples, taken from the wells of both camps, were submitted to chemical analysis, with very generally favourable results—so much so, indeed, that from only one well, and this in the lines of the South Camp, was the water pronounced to be "not desirable" for drinking purposes.

With reference to the analysis of the samples of the water, the following memorandum was submitted by Mr. Abel, the chemist to the War Department:—

"Fourteen different samples of water were received, taken from wells in the North and South Camps.

"The whole of the samples were of the same general character, and, from their composition, it appears that the supply of water to the different wells is mainly derived from the drainage of rain-water through the soil.

"All the waters are soft (containing only small portions of earthy salts);

some contain only small quantities of organic matter of vegetable origin, and no objectionable impurities whatever; some few others contain minute quantities of nitrates and higher proportions of organic matter, and nearly all were found to contain in suspension small quantities of oxide of iron, originally in solution in the water, and derived from the soil.

"The water of lowest quality in all respects is that from the well of Z lines, South camp, which contains very appreciable quantities of nitrates, and a large proportion of vegetable matter. This water, though suitable for general domestic purposes, is not a desirable water for drinking.*

"The waters from wells in G, S, and W lines, South Camp, also contain rather large proportions of organic matter, but the first and last named do not contain any nitrates, while that from S lines well contains only very small proportions. H lines well-water, South Camp, is very soft, contains no nitrates, and the smallest proportion of organic matter in the waters of the South Camp.

"The waters of the North Camp are generally superior to those of the South Camp, not only as regards softness, but also with regard to the proportions of vegetable matter which they contain.

"Those from Nos. 1 and 2 wells in E lines, No. 2 pump in K or R lines, No. 2 pump in I lines, and No. 2 pump in Q lines, are remarkably pure. The waters from No. 1 pump in I lines, and No. 1 pump in R or K lines, contain the largest proportions of vegetable matter (being about equal to the well-water from H lines, South Camp, in this respect). The first-named water is free from nitrates, the second contains a small proportion. The water from the iron pump at Heath End is also a water of good quality. An imperial gallon of it contains only 10·50 grains of solid matter, of these 1·4 grains are organic (vegetable) matter, and only minute quantities of nitrates are present.

"The total proportions of solid matter, and the amounts of organic matter in the waters from the different wells and pumps in the North and South Camps are as follows:—

Proportions, in grains, in one Imperial Gallon.

	Total solid Consituents determined in the Filtered water.	Organic Matter determined in the Filtered water.
North Camp.		
I Lines, No. 1 well	8·12	3·36
„ 2 pump	8·68	1·12
K Lines „ 1 „	9·38	2·90
„ 2 „	6·02	0·98
Q Lines „ 1 „	8·12	2·38
„ 2 „	7·70	1·54
E Lines „ 1 well	5·46	0·98
„ 2 „	5·74	1·54
South Camp.		
G Lines	14·00	4·48
H Lines	6·72	3·08
S Lines	11·48	3·92
W Lines	17·08	4·06
Z Lines	16·94	6·02
Iron Pump, Heath End	10·50	1·40

(Signed) "F. A. Abel,
"Chemist of the War Department.

"Woolwich, October 28th, 1861."

At a time when the supply of water from the main Reservoir on the height of "Cæsar's Camp" was suspended during alteration and improvement of the works (filtering), much inconvenience is stated, in the report of one of the cavalry regi-

* It was suggested, in consequence, that a notice should be affixed to the well in Z lines, that the water should only be used for cleansing purposes.

ments, to have been felt for months in the permanent barracks occupied by the corps. The exigency, however, is represented as having been met with a judiciousness of resource by the regimental Quartermaster, who collected from neighbouring springs, and, at a trifling expense, laid on a sufficient supply. With reference to this, the Surgeon of the 9th Lancers, Dr. Clifford, has remarked that the quality of this water was superior, that this branch supply might be collected at comparatively cheap rate, be raised by a force pump to a tank, and all inconvenience obviated for the future at this permanent barrack of the cavalry.

Very great inconvenience from want of a copious supply of water during the last, a dry summer, having been experienced, more particularly by the mounted troops, the necessity of constructing a new reservoir for the camp, by proposed means of military labour, was mooted by the authorities; and the arrangement suggested was that a corps of 300 or 400 should be encamped on the spot, Cæsar's Camp heights, where there was a favourable site. The men were to have been placed under double tents for the winter, and to have wooden floors supplied to them. A weather-tight kitchen round a Grant's field-cooking apparatus was proposed to be furnished for their use, and every care was to be considered and taken for securing the health of the troops to be thus employed on a novel experiment of military labour during a winter season. The design, however, of thus employing the troops was not eventually prosecuted, although on sanitary grounds no objection was taken to it.

The *clothing* of troops when undergoing a camp life is always more especially a subject of great attention by the medical officers, whose very concurrent opinion in favour of flannel under-clothing is well confirmed in the following general allusion to the subject in a report of a most experienced Inspecting-Medical Officer of the Camp, Mr. Stewart:—

"I conceive the want of *flannel under-clothing* in infantry regiments to be a most serious defect, and one which, in my opinion, must tend greatly to the prevalence of chest complaints and consumption—the sources of so much inefficiency and final disability throughout the service. In India, flannel under-clothing is furnished to the soldier (cavalry and infantry) as a part of his kit, and as necessary to health. It can be no less so in the damp, variable climate of the United Kingdom; and, if necessary also to the health and comfort of those in private life, it can be no less requisite in the case of the soldier, liable, from the nature of his duties, to be exposed to every vicissitude of the weather."

THE CAMP OF SHORNCLIFFE.

The course and tenour of the sanitary economy at this camp were very even during the year, and the Principal Medical Officer, in the Annual Report, pronounces the hygienic arrangements in their general system to have been regularly carried out, and to so satisfactory an end that no disease was attributed to local causes at any period of the year. His report epitomizes, under the usual heads, to the following purport:—

In the permanent barracks, a small range, the men, 112 in average number, had an accommodation in mean monthly rate of 440 cubic feet of breathing space each; and in the huts, occupied by a monthly average strength of 3,169, each soldier was afforded 380 cubic feet as to the infantry, and 418 in the squadron of cavalry, thus meeting in very close precision the standard of the new regulations on the occupation of the hut structures.

The additional experience of this year is adduced to prove that the general construction of the huts is conducive to the health of the troops, although a weather porch to the doors, under the circumstance of the high and on all sides exposed plateau of the camp, had been again suggested; a similar recommendation having been put forth several years ago, but which failed of desired result through financial considerations of the time as to so necessarily general and extensive a measure.

The bath and ablution accommodation was sufficient for each regiment, and

appeared to be freely made use of by the soldiers, who, at this station, moreover, enjoy the especial advantage and facility of sea-bathing, a boon availed of by numbers at their own discretion, irrespectively of the two regulated days a-week for general bathing parades.

The cooking for the troops continued to be effected by means of Grant's apparatus for each corps, and, as to facility and variety, came under satisfactory report; the diets were allowed to be prepared according to the varying wishes of the men.

The ration supplies throughout the year appear to have been of the average good product of the district; but the operations of the Commissariat Department, in the economy of general supply, had not yet been extended to thi camp.

No nuisances from latrines, urinals, ashpits, manure heaps, drains, or from want of surface-cleansing were allowed to become obnoxious, or to remain unrectified for any length of time.

The water supply from the Folkestone Reservior at no season failed of its stipulated quantity to the camp, or deteriorated in quality.

With an average of nine nights consecutively in bed to one on guard, taken into account with the salutary range of the general duties in field exercises, route marching, &c., circumstances throughout the year contributed at so salubrious a station to maintain a high standard of health and efficiency among the troops; and the ordinary instruction drills were conducted at such hours of the morning and afternoon, with reference to season and daily meal times, as were most conducive to the comfort and health of the men.

For each regimental range of huts a fives'-court has now been provided, and these courts, with cricket, football, &c., have proved good sanitary resources in the many leisure hours of the infantry corps.

Of the Garrison Hospital, after its many altered arrangements and improvements, detailed in the Report issued last year, all is commendatory of its condition and comfort since.

Of the average annual strength of troops at Shorncliffe—4434 rank and file—the mean number of sick in the hospital wards was 210, and, relatively, the average monthly appropriation of cubic space amounted to the comparatively high ratio of 1,000 feet to a patient.

The deaths occurring from diseases of the zymotic class, this year, collectively numbered five only, their instances being attributed to sporadic and accidental influences, and not to any defects connected with the sanitary arrangements of the camp or hospital.

WESTERN DISTRICT OF ENGLAND.

Devonport and Plymouth.—The Annual Report on these combined garrisons, by the Deputy-Inspector-General of Hospitals of the district, Dr. C. A. Gordon, C.B., has included information as to the more special sanitary works and improvements in course of the year under review.

During the period a good deal seems to have been effected in the way of improvement to the barracks, as well as to the buildings accessory to them.

Citadel of Plymouth.—Here the floors of the casemate barracks have been boarded, a measure adding much to comfort and freedom from damp. Ventilation has been improved by a silk flap ventilator placed in each chimney, and an inlet for air, covered with perforated zinc, arranged over each door. Additional light has been admitted by altering the windows. The fire-places have been improved, and greater warmth is now maintained in these rooms. In the large or ordinary barracks of the citadel, air shafts and inlets have been introduced for better ventilation of the rooms, the fire-grates having also been remodelled to combine in effecting that object. The soldiers' library, the schoolroom, and tailors' shop have had improved ventilation. Bath-rooms have been established, as also ovens for the men's use; and these were in further course of being provided. Latrines have been fitted with divisions

of seats, and supplied with means of flushing. Gas has been introduced at several points.

Prince of Wales Redoubt.—Inlets for ventilation of the men's rooms were the principal sanitary measure effected.

Old Granby Barracks.—Inlets and outlet shafts for air renovation were introduced in each room, and the new ventilating fire-grates were erected; gas, also, with ventilated burners, was laid on. New ovens were provided for the kitchens. The latrines and urinals were much improved, and furnished with flushing means.

Maker Heights Barracks.—The new artificial system of ventilation, with the remodelled fire-grates, was also here introduced in the men's rooms, and means for varied cooking were furnished.

Bull Point Barracks.—The ventilation of the rooms was improved as above. The cells at this station were also ventilated more effectually by shafts through the roof of each, and by gratings opening into the corridor. An oven was set up in the cookhouse.

Mount Wise Barracks.—The main improvement effected here was, considering these defective buildings for barrack purposes, and their site, the reduction of the number of men in occupation so far as to afford each soldier 600 cubic feet of air. The new artificial system of ventilation was introduced. The fire-grates of the men's rooms were remodelled.

The Raglan Barracks.—The ventilation of the rooms, in certain respects, was rendered further satisfactory, and that of the guard-room improved.

The Garrison Hospital at Stoke.—This establishment, so objectionable as to its site, was alluded to in considerable detail in the Report of the previous year; and it does not, on this occasion, appear necessary to enter into particulars in respect of its requirements and interior economy, as measures are in progress with a view to its being placed upon the footing of the new system of a general hospital. The unfavourable circumstances connected with its position, however, form the subject of animadversion by the Regimental Medical Officers anew this year; but the Deputy-Inspector-General seems not to think that any of them are altogether irremediable. He is of opinion that some of the sources of objection might, indeed, be altogether removed, whilst others admit of great improvement. The main objections and suggested remedies he specifies side by side, as follows, viz.:—

Objections.	Suggested Remedies.
1. On the south side of the hospital is a tidal estuary; at low water a large amount of mud undergoes decomposition when the sun is powerful.	1. Were a terrace, or raised causeway, built along the tideway the objection would be remedied, and ornamental gardens might be laid out upon it. (This, a question of embankment, was put forth in the Report of last year; but having its financial bearing also in the scale.)
2. The present drains of the hospital buildings, opening under low-water mark, are ventilated by apertures situated not more than a few feet above high-water; the effluvia thence are wafted directly back upon the hospital during southerly winds.	2. This evil could be remedied by the drains being ventilated by means of shafts raised to a considerable height above the roofs of the hospital main buildings.
3. On the west are some extensive vegetable gardens, from which, during summer, pernicious emanations are believed to arise.	3. It might be hoped that reference to the municipal authorities would bring about a suppression of them, although vested right of private property might interpose difficulty.
4. On the north side is a large burial-ground, five and a half acres in extent, in which on an average eight hundred interments take place annually; thus rendering it necessary that each grave be disturbed once every sixteen years.	4. This might be remedied wholly by the suppression of burials there, or, partially, by restricting the number of interments and confining them to certain parts of the ground.*

* A proposal to have this cemetery closed was submitted by the Director-General of the Army Medical Department (Dr. Gibson) to the Government authorities in February, 1862.

The sanitary duties of the garrisons were so effectively carried out on all points, under the unremitting and vigilant superintendence of the Medical Officers, that no disease at any time among the troops could be attributed to defect of hygienic arrangements. The strength of the garrisons having been much of an average with that of the preceding year, the circumstances of cubic accommodation for the men in barracks generally and the sick in hospital varied little from the averages then prevailing. The ration and water supplies were as good in quality as previously, the latter having been sufficient for all ablution and culinary purposes. A reduction in the night duties of the men was gained, it is represented, by the employment of the Royal Dockyard Police in augmented numbers, and the troops had come, thereby, to benefit considerably.

On the abstract health question of the year, the Principal Medical Officer points out the circumstance that, of a total of admissions to hospital amounting to 4,287, in an average annual strength of 3,823, as many as 1,667 were numbered of the venereal class alone, and, very exceptional in ordinary experience, no fewer than 235 of itch. Thus, he observes, "diseases attributable to vice have far out-numbered those which arise from ordinary climatic causes; and next in frequency were those resulting from low associations on the part of the soldier."

The odium of prostitution has maintained its prominence here as at the other great seaport and garrison towns, and continues to involve not only the question of ruined constitution of individuals, but a weighty consideration to the State for non-effective duty men, and a burdened pension-list of invalided soldiers.

Correlatively with the foregoing vice—that of intemperance,—as regards the garrison during this year, is adverted to by Dr. Gordon as having been comparatively modified; and he observes the fact of the much greater expense of spirituous liquors than at the generality of foreign stations, such being no doubt one chief cause of the proportionately small amount of drunkenness that appears in the Returns to have come under notice; whilst another reason is instanced in the limited residue of daily pay at the soldier's disposal. From these two circumstances, therefore, the direct effect of intemperance in producing disease was thought to be very small; but, unfortunately, as he represents, the gain in this respect was far outweighed by the facilities and temptations for other immorality which beset the soldier at every turn in a garrison town.

THE SOUTH-WESTERN DISTRICT OF ENGLAND.

The Principal Medical Officer of this District, Dr. Hume (now Inspector-General), in his Annual Report on the Barracks and Hospitals, makes allusion to all the main sanitary conditions attaching to them. In reference to the cubic accommodation, he reports that the construction of most of the barracks did not admit of the full allowance of 600 cubic feet per man, as prescribed by the new Regulations; but, as many of them were not occupied fully to the old numbers painted on the doors, the soldiers reaped the advantage, and their health generally did not appear to suffer from insufficiency of accommodation within the rooms at any station.

He has submitted an Occupation Return, as made on his last sanitary inspection, and its averages are to be accepted as those holding pretty closely for the year. From the bearings of this Table, he has observed that the men had a cubic rate in barracks averaging from 450 to 500 feet each, and in some instances even more; that the guard-rooms generally admitted of about 400 such feet for each man on this duty, and the solitary cells for prisoners 550 cubic feet.

In respect of the cubic accommodation which prevailed in the hospitals of the Command, he has given the following Table as an approximate of the mean ratio at the several stations, founded on the monthly averages of sick in wards.

Corps.	Stations.	Average of Cubic Feet per Patient in Hospital.
Royal Artillery	Portsmouth	870
,,	Hilsea	620
,,	Hurst Castle	1,000
,,	Isle of Wight	750
,,	Christchurch	640
1st Battalion 2nd Foot	Portsmouth	800
1st ,, 5th ,,	Portsea	900
2nd ,, 18th ,,	Portsmouth	800
1st ,, 24th ,,	Gosport	950
41st Foot	Parkhurst (Isle of Wight)	718
49th ,,	Portsmouth	950
5th Depôt Battalion	Parkhurst (Isle of Wight)	650
7th ,, ,,	Winchester	800
21st ,, ,,	Chichester	1,500
41st Foot	Sandown (Isle of Wight) encamped	1,000
6th Dragoon Guards	Dorchester	660
Detachment 49th Regiment	Weymouth	630
,, 41st ,,	Marchwood	850

At the Principal Medical Officer's periodical sanitary inspections throughout the District, various more special defects in ventilation of barracks, guard-rooms, cells, and outhouses, were pointed out by him, were brought to the notice of the authorities, and many of them were rectified.

Under the head of "Cleanliness," Dr. Hume reports matters as having been tolerably good generally; but, in his December series of Inspections, he had occasion to observe that in many places due regard had not been paid to this most important subject. In some barracks, dust and dirt were found under the bedsteads, blankets were observed to be dirty and torn, sheets also dirty, and the rooms and passages not kept so clean as they ought to be. These evils were severally represented by him to the local military authorities.

The barracks at Portsmouth have now mostly been lighted with gas; one or two exceptions, however, still there exist.

Upon the concomitant question of warmth to the barrack-rooms, Dr. Hume refers to the necessity having arisen for an increased allowance of fuel at times of the winter; and this, as inferred, subject to the working of the new ventilating fire-grates.

The barracks and hospitals of the District, generally, were supplied with lavatory accommodation of a suitable nature, and had become furnished with baths, he states, with few exceptions.

The kitchens and cooking-utensils throughout the Command appear to have been sufficient, and kept in good order generally; and the ration supplies were fully approved of, save that the very universally accordant opinion of medical authority held as to the insufficiency of three-quarters of a pound of meat a-day for a soldier.

Upon the sanitary conditions of latrines, urinals, &c., and with regard to the many old constituted barracks of this District, the Inspecting Medical Officer reports that, though not thoroughly satisfactory, they were improved this year in many instances; and that recurring complaints were not so numerous as in the preceding, all cesspits being much more frequently discharged of their contents.

The military duties appear not to have affected the health of the troops in any appreciable sinister degree—the night ones in the Dockyard garrison not recurring oftener than to admit of the soldier having four and five consecutive nights in bed; many more falling to his lot and comfort at the out-stations.

An especial boon was conferred by the Government in the opening of a small, and so far extemporized, hospital for the sick wives and children of the garrison of Portsmouth. This embryo institution of the kind is situated

intermediately to the Portsea and the Portsmouth Barracks, on the so-called "milldam." A nurse had been appointed, and the establishment had been in order of occupation for about the last three months. The arrangement is only as a temporary measure, to meet the humane and pressing requirements of so large a garrison; it being the intention of the Government to build and organise a permanent female hospital for the station.

From the Regimental Sanitary Reports of the year, specially, are gleaned the following various points commented on at different stations.

In *Portsmouth*, Surgeon Perry, R.A., adverts emphatically to the prevalence of venereal disease there, and bears testimony to the benefit and advantage of the legislative enactment at Malta in contrast of results. He writes: "Medical officers are unable to grapple with the evil unless police authorities aid in restriction upon the source whence it is derived—the only means whereby a great and really terrible evil may be lessened, if not abolished, and a better state of public health become the result. Vice is not legalised by its effects being carefully watched and checked; and hence, if the vocation is well known, the mischief arising from such a calling should be under police control as much as any nuisance affecting the public health."

At *Hilsea*, Assistant-Surgeon Hopwood, R.A., the medical officer in charge of the troops (Artillery), adverting to the works of extended barrack accommodation at this neighbouring outpost of Portsmouth, states the bath and ablution means to be excellent, and the cooking-ranges unexceptionable. The new barracks here were in process of constructing on the hut principle of the Barrack and Hospital Improvement Commission. A new and commodious hospital was arranged for, and other important sanitary works were contemplated.

At *Chichester*, Surgeon-Major Dr. Gibb reiterates complaint of the very defective drainage of the barrack site, it remaining still *in statû quo*, as pronounced by the Barrack and Hospital Sanitary Commission in 1859; and to effect as follows—that the barracks are most imperfectly drained, and that there is nothing but superficial surface-drainage in all states of imperfection; that the whole arrangement is as defective as it well can be, and requires a thorough reconsideration, the conclusion of the Commission being that it appeared necessary to proceed at once to the drainage of the barracks. Obstacles, however, are supposed to have involved the proposal, and it is believed the question now holds whether ultimately to continue the locality as a military station. In accordance with the recommendations of the Commission, all other defects pointed out by them in the above year at this post have been gradually remedied.

At *Winchester*, the ablution establishment, consisting of dark, underground chambers, damp and uninviting, was the subject of representation to the local military authorities; and extra gas convenience was recommended for the purpose of rendering the accommodation practicable even by day.

In the yet rough and very rudimentary stage of the soldiers' culinary art, the cookery of soup (still the more general predilection of the men) engaged the attention of Dr. Alexander Smith, the Staff-Surgeon in charge at Winchester, whose memorandum on the subject and receipt for the better preparing of the soup diets may be subjoined:—

"MEMORANDUM.

"Winchester, 11th November, 1861.

"The accompanying is a copy of the Instructions for preparing soldiers' soup diets, which have been in use at this place since June of the present year, and which are based on the latest rules for preparing similar diets in military hospitals. As the allowance for messing in barracks is not sufficient to give all that is recommended in the hospital soup diets, the sugar has been struck out and only as much of the mixed vegetables (such of them as may be at the time procurable) used as the sum over for small vegetables will purchase. The full quantity of barley is always used, and the object is to bring up the allowance of vegetables as nearly as possible to the proportions named in the Instructions, consistent with the means at the disposal of the Company. In Winchester every Company has on the average baked meat on two days in the week, and the gain on these days from small vegetables not being used is carried to the account of the days having soup diets.

"We find here that the richness of the soup in vegetables depends on the price of potatoes, as the allowance of that important article of diet is kept as high as possible throughout the year.

"The advantages of the system I have endeavoured to introduce at Winchester are—

"1st. That the soup is made on a uniform system, and, as much as the soldiers' pay will admit of, according to the best known receipt; as nothing can be better than that now ordered for military hospitals.

"2nd. That by following exactly the rules for managing the cooking, any soldier may cook well after a few trials, and therefore the men will not have to suffer, as they hitherto have done, from frequent change of cooks."

QUANTITIES of WATER required for Soup, according to the Number of Diets:—

	Quarts.	Pints.		Quarts.	Pints.
1 Diet	1	0	9 Diets	6	1½
2 Diets	1	1½	10 Diets	7	1
3 Diets	2	0½	20 Diets	13	1
4 Diets	3	0	30 Diets	20	0
5 Diets	3	1½	40 Diets	26	1
6 Diets	4	1	50 Diets	33	1
7 Diets	5	0½	100 Diets	66	1
8 Diets	6	0			

SOUP DIETS.

Ingredients or Diets.	One Diet.	Ten Diets.
Water	1 quart	7 quarts 1 pint
Meat	12 ounces	7 pounds 8 ounces
Barley	1½ „	15 „
Vegetables	4 „	2 „ 8 „
Flour	¼ „	2½ „

AMOUNT and DESCRIPTION of Vegetables for Soup:—

Vegetables.	Ingredients for every Ten Diets.
Carrots ..	14 oz.
Turnips ..	14 oz., or 14 oz. cabbage, or 7 oz. of each, according to the season.
Onions ..	6 oz.
Parsley ..	2 oz.
Leeks	4 oz., or celery 6 oz., according to the season.

INSTRUCTIONS for Preparing Soup Diets.

"1st. The barley for the soup must be steeped over night in the quantity of water required for the number of diets.

"2nd. At 8·30 A.M., put into the boiler (previously carefully cleaned) the given quantity of water and barley, and the meat (which should be first washed); stir from time to time, to prevent the barley from burning. Wash the vegetables, and carefully cut them into very small pieces.

"3rd. At 10 A.M., reduce the fire by partially shutting the damper or opening the furnace-door, so as to cause the contents of the boiler to simmer slowly; carefully remove all the fat or skum which may have risen to the top, and then add the vegetables.

"4th. At 11 A.M., remove the meat from the boiler, and let the soup continue to boil slowly: mix the flour with cold water till a very thin and smooth paste is formed.

"5th. At 12·30 P.M. stir the paste of flour and water into the soup, replace the meat in the boiler, and let the whole boil for half an hour.

"At 1 P.M., it will be sufficiently cooked.

"ALEX. SMITH, M.D., Staff-Surgeon.

"Winchester, 25th June, 1861."

At *Parkhurst Barracks* (Isle of Wight) the objectionable position of the latrines, so central and adjacent to the officers' barracks, has remained un-

remedied in its being a rooted evil connected with the old cesspit system still in existence.

The Medical Officer of the Depôt Battalion stationed here, Surgeon-Major Dr. Johnstone, speaks highly of an excellent Soldiers' Institute and Leisure-Amusement-Room in the neighbouring town (Newport), established by his late Royal Highness the Prince Consort, and which is valued and enjoyed very universally by the soldiers. It is supported by donations and subscriptions from the officers, by friendly contributions, and by a monthly subscription of threepence from each soldier who becomes a member of the institute.

SOUTH-EASTERN DISTRICT OF ENGLAND.

This District is under the medical and sanitary superintendence of the Deputy Inspector-General at the Camp of Shorncliffe. After the many advantageous works and services carried out by the Barrack and Hospital Improvement Commission, during the three preceding years, there was comparatively little undertaken further in this year under review, although some important measures of various improvements were projected, but which necessarily, from financial reasons, had to stand over.

At *Canterbury*, both in the Cavalry and Infantry barracks, as also for the Artillery, baths were still wanting, and the old cesspit system of latrines had to be endured, under the prospect, however, of a new source of water supply from a high level, which would not only flush and force the sluggish drainage of the low site the barracks occupy, but, moreover, was amply to provide thorough ablutionary means for the troops, and to establish water latrines.

The average of barrack accommodation afforded to the mean strength of the troops this year was rather within the old boundary of limitation—not more than 416 cubic feet per man for the Dragoons, and about 460 for the Infantry.

In the garrison hospital the accommodation was quite limited to about the old regulation standard for each patient; and the establishment remained in expectation of enlargement by the addition of a new wing (commenced 1862), and accessories of a laundry, bath and ablution-room, purveyor's stores, and other new out-buildings.

At *Walmer Barracks* extensive drainage improvements (so greatly required) were commenced, and an additional water supply, to effect its thorough discharge, was arranged. The strength of the Depôt Battalion quartered here appears, in its mean, to have given an average of not more than 434 cubic feet monthly per man in the barrack-rooms. The hospital accommodation, however, was amply at disposal, the sick list never being numerous, or approaching a necessity to over-crowd.

From *Dover* the Sanitary Reports of this year afford little material for comment, beyond what was submitted in the volume for the preceding year, when the main points of barrack improvement had been effected through the recommendations of the Commission. Several considerable improvements, nevertheless, were made variously as to the barracks, upon necessities being shown. Extended bath and ablution accommodation was recommended or planned at points where deficient: in the Castle Barracks the latrines and urinals were now all regularly flushed, a command of water force being obtained through the steam power of raising the supply to the high level of the "keep," from which its consequent pressure had full effect in gravitating the drainage to its point of ultimate discharge.

The Regimental Returns show the cubic accommodation, as estimated, in mean monthly rates of 562 and 450 feet per man in the Western Heights and Citadel Barracks,* and but only about 400 in the Castle; the results, however, being very similarly those of no prejudice to health.

With reference to the hospital accommodation, the Senior Medical Officer at the Castle, Surgeon Voss, R.A., reports that there occurred no instance of

* According to the strength of two successive regiments occupying them.

unavoidable over-crowding this year in his hospital, as there did last—not from epidemic sickness then, but from the necessities of an increased number of troops for a time. 750 cubic feet to a patient formed the mean monthly allotment in the Castle Hospital.

CHATHAM GARRISON AND DISTRICT.

The Sanitary Reports of the garrison of *Chatham* almost repeat the conditions of the preceding annual period, as to the very limited barrack accommodation, in cubic space, per man in mean for the year, the rotation and nature of the duties, the night guards, and daily military instructions and parades in their effect upon the youthful soldier and the enervated one returned from Indian service.

In two of the Depôt Battalions the estimated cubic space per man in the rooms averaged for the annual period not more than 386 and 374 feet—so great, apparently, the pressure for accommodation usual at this large general depôt of the Indian regiments.

The leading sanitary improvements, applied to the home barracks generally, having been here also carried out in course of the preceding three years, works of the kind appear as having been few, comparatively, during the annual period under retrospect; and no very prominent ones are pronounced in the several Reports received.

In more special comment, Dr. Ferris, Surgeon-Major in charge of Head-quarters of the corps of Royal Engineers, attributes many admissions to hospital among these men to the circumstance of their being employed on duty in damp places, on field works, &c., and to being frequently amidst water on the instruction duties of pontooning and other relative military works; yet the rate of mortality in the corps does not show in any comparative excess, the number of deaths in hospital this year being 9 only in an average strength of 997 men.

Surgeon-Major Dr. Maclean, of the 1st Depôt Battalion, in his Report alludes more particularly to the section under the head of drill, representing this, when practised to any length before their breakfast, as too much for growing lads; the old soldiers, he was further of opinion, should be spared from carrying their knapsacks on guards, &c. Both views were recommended, he states, by him to the authorities, and came to be adopted with the most favourable results.

The average of nights in bed to the battalions appears to have been from four to six to each duty soldier, and must be looked on as not very taxing duty of the kind customary to troops, young or old.

The Reports express no dissatisfaction with the qualities of the ration supplies furnished to the men. Conveniences of varied cooking were not wanting; and the general hygiene of the garrison was punctiliously attended to by the medical officers in charge of troops, under the additional guarantee of the Inspector-General of Hospitals at this station.

The condition of the garrison hospital seems to have been very satisfactory throughout the year; for, although the available allotment of cubic space per patient is shown to have been of an average very far short of the 1,200 feet of the new Regulations, no positive cases of retarded recovery or impeded convalescence are, in the Reports, placed to the account of limited cubic area within the hospital wards.

Sheerness.—This was an outpost of the Royal Artillery from head-quarters at Woolwich, and was occupied by a division of the "Depôt Brigade"—916 in average strength, and to whom the barrack accommodation afforded was at the mean monthly rate of 560 cubic feet a man.

Renewed objections were, as of course, taken to the very low level of the barrack site, in its hygienic respect, at some points it being actually about two feet below high water; and reference is made by the Medical Officer, Surgeon Ward, R.A., to the so-termed "old barracks" being badly ventilated: these formed the accommodation for the married soldiers almost entirely. In the

contra-distinguished "new barracks" the improved system of artificial ventilation, in connection with the remodelled fire-grates, continued in operation; and the advantage of gas, as the means of lighting, was general.

Water supply to the garrison, adverted to last year as obtained by steam power from a well of much depth, and laid on for the use of the troops, continued of good quality, but was at all times more or less limited for general purposes, insomuch that it was contemplated to sink another similar well. The supplies to the troops appear to have met with approval; and the means of varied cooking were pronounced satisfactory.

The men enjoyed an average of seven nights in bed to one on guard; and the general range of their duties at this, a reputed malarious station, apparently cannot be said to have been prejudicial to their health this year, when only fifteen admissions to hospital took place from ague; and it is represented that in the composition of the division were several old Indian soldiers, who probably had suffered from malarious fever in the East.

The chief sanitary nuisance was the imperfect system of the drains of the "old barracks:" they again proved offensive, were so represented, and had ventilators introduced at certain points, with satisfactory results. Another sanitary objection still holds in the latrines being mere cesspits, the water means being yet wanting to remodel them. The lock-up-room was represented as badly ventilated and under-warmed, being also often damp. Recommendations were made by Surgeon Ward to have its fixed bed boarding converted to a folding one, for the purpose of securing greater cleanliness beneath, to have ventilating bricks inserted in the walls, and a hot-air pipe to pass through the room.

The hospital establishment has been very favourably reported on as to its interior comfort and general convenience, leaving little to specify on this occasion, beyond a rectification of some points of drainage. 710 cubic feet of ward accommodation per patient are assigned to have been the mean monthly average for the course of the year.

Maidstone.—An average strength of 421 is reported to have formed the Cavalry Depôt at this station, to which is added the fortunate circumstance of only two deaths in the hospital.

No new circumstances of sanitary import, as to the present barracks, have taken place since last year's reference to their condition; and, as arrangements are understood to have been made for the construction of new barracks for a larger force, and for the hospital to be extended to meet the anticipated increased strength, more requires not to be stated, on the present occasion, than a reference to the point of the average of cubic accommodation which the men in barracks obtained in mean for the year: this was of nearly the old regulated rate, having been 441 feet per man; and Surgeon-Major Galbraith's Annual Sanitary Report indicates well of the prevalent good health of the troops, in representing that a monthly mean of 1,248 cubic feet was distributable in the hospital wards for the treatment of the sick.

The town of Maidstone having obtained its water supply this year from higher up the Medway, it is proposed that the troops should participate in the advantage, and that a main should be laid on to the barracks from this source, so as to do away with the use of the "hard and lime-imbued" water from the present barrack wells.

Surgeon-Major Galbraith makes allusion to an analysis, by Dr. Letheby, of the New Water Company's supply, and which pronounces it to contain over 15 per cent. of "impurities," 1·6 of which is organic matter: the water is, however, stated to be good for all domestic purposes.

WOOLWICH GARRISON, SHOEBURYNESS, AND WARLEY.

The chief sanitary works and improvements effected in the garrison of Woolwich, this year, may best be set forth in extract from the general sanitary Report of the troops in garrison, by Dr. MacGregor, the Deputy-Inspector-General of Hospitals;—

"During the year considerable improvements have been introduced in the huts and barracks.

"The lock-up at the main guard has been completed, but the warming apparatus to be attached thereto was not granted up to the end of the year. It has since been sanctioned.

"In the Horse Brigade lines the guard-room (north face) was eased of its overcrowding, and a room on the opposite side of the road was added, which gives accommodation to the piquet at night.

"For the riding-school establishment new bath-rooms and cook-houses have been completed, and with the latest improvements.

"New latrines have been constructed on the south side of the 'East Square,' and fitted with Jennings's patent contrivances.

"The soldiers' reading rooms have been effectually ventilated.

"The military prison was improved by the introduction of fresh windows of a circular form in the walls. The cells are ventilated by valved gratings, and to a considerable extent have been made comfortable. The prison is warmed with heated air when the temperature is less than 53° Fahr., latterly 55° Fahr. has been the minimum.

"In barracks a good many of the new and improved grates have been introduced. They are now called Kennard's patent ventilating stove. There was some misunderstanding at first of the principle on which the ventilators erected were worked. The Commanding Royal Engineer has since supplied printed regulations for the guidance of the inmates.

"During the year considerable progress was made in supplying most of the barrack-rooms with a shelf supported from the ceiling for the storage of the clothing, and for other conveniences of the men.

"In the Military Train hut encampment a good deal has been done, and more is promised, to render the grounds and huts more healthy. The subsidiary stratum of moisture* has been drained away. Conveniences have been placed at the ends of most of the huts for night-tubs, with doors opening from the outside for the removal of their contents.

"The Auxiliary Hospital has been completed, and fitted for the occupation of 40 patients.

"A considerable number of improvements are already sanctioned for completion in 1862-3, viz. :—

"Extension of guard-rooms, bath-rooms, latrines, urinals, drainage of stables, improvements in the infant school, the Royal Artillery Institution, the horse infirmary, and in the cook-house of the hospital, where a bakery is to be introduced.

"For the soldiers' families a female hospital is in contemplation, and the 'Herbert' Hospital has been commenced at Kidbrook.

"Unfortunately, some improvements strongly recommended are not included among the expectations. That of the canteen is of this nature. An effort will be made in the ensuing estimates to meet this want.

"In the lock-up two Gurney's stoves are to be erected.

"In the present garrison hospital an oven for fumigation of infected clothing has been applied for. During the year the garrison hospital was converted into a general one. A governor and captain of orderlies were appointed, and a superintendent and a staff of nurses.

"In the month of September last 80 rooms were completed for families of married soldiers, and occupied soon after—a truly great boon in this garrison.

"The Commandant has erected a wooden laundry with two boilers, for the benefit of the soldiers' wives—a third has lately been added.

"A well-ventilated store for keeping the butchers' meat, and other supplies for the troops, was commenced during the year, and pushed on rapidly for completion."

The foregoing statements from the General Report of the Principal Medical Officer pretty well exhaust the sum and substance of results as to the works of sanitary service effected during the year in the garrison.

The Brigade Reports add little to the account of the general one. Dr. Fogo,

* A circumstance referred to in last year's Report.

Surgeon of the Royal Horse Artillery, refers more particularly to the ventilating grates of the barrack-rooms, and represents that the winter season was not severe enough to try them duly. Mr. Gallwey, Surgeon-Major 4th Division, Depôt Brigade, characterizes its composition as a "fluctuating body, constantly coming to and departing from Woolwich, consisting principally of old soldiers and invalids, and as not being subject to augmentation by recruits." He more emphatically alludes to, and (considering the classes above stated as composing his charge) may very reasonably animadvert on the fact of the baths attached to their barracks rarely or never being used by the men in the course of the winter, the means of warm water to counteract icy chills, the want of adequate materials for drying the person, and other conveniences, forming valid excuses. But these excuses hold good generally in the home barracks, and the bath accommodation, wheresoever furnished, is in most instances in winter a void institution with the troops, there being no grant for a hot water supply to qualify the frigid temperatures, a question of expenditure being still deferred.

Upon the point of cubic accommodation in the barracks this year, the Brigade Reports give a mean monthly range from so low as 348 cubic feet per man in the 10th Brigade to as high as 576 in the Royal Horse Artillery.

With regard to the hospital accommodation in the same respect, 800 cubic feet per patient in the Garrison Hospital may be assigned as having been the round number for the year.

In the hut encampment on the "Common," the battalions of the Military Train had a mean monthly rate of 300 to 350 cubic feet per man in the barrack huts; and the sick from 550 in the hospital huts, as specified in the report of one battalion, to 832 per patient in that of the other.

Shoeburyness.—Surgeon-Major Guy's (Royal Artillery) very comprehensive and satisfactory report on this station states the new barracks to be built on the best principles; they are arranged in "blocks," each block being again subdivided into two houses with distinct entrances. Each house has two rooms on the ground floor and two on the upper. The size of each room, two of whose walls communicate with the outer air, is such as, on the lower floor, with 12 occupants, to distribute 560 cubic feet to each, and on the upper to allow as much as 712 to every man of a similar complement. On the ground-floor of each house a cleansing room adjoins, and on the upper a bath and ablution room, with a night urinal for the whole house, is provided. For each "block" a commodious kitchen with a good cooking range exists, and two small non-commissioned officers' quarters at each end of the block complete the distinct building.

Dr. Guy reports the whole system of ventilation of the buildings as excellent.

With regard to the barrack cells, means for insuring a more complete transverse current of air through their passage was adopted on his recommendation.

The occupation of the present hospital, for the year, numbered five patients in a ward, giving each the monthly mean of 980 cubic feet. Its ventilation was much improved by the introduction of Sherningham's ventilators on the outside wall of each ward for the admission of pure air, and by carrying a shaft to the roof on the opposite side for the exit of foul, this measure being effected also at Dr. Guy's suggestion.

For the strength in occupation, under the new arrangements for the gunnery practice at Shoeburyness, the hospital accommodation, as still existing, is insufficient for all contingencies; the garrison now, when full, amounts to some 700 men, and the present hospital contains only six wards for five men each, insofar being inadequate to meet a possible extra demand for the admission of accidents ever liable to be met with at the gunnery practice.

The duties of the men admitted of their having seven successive nights in bed. For the entire year the average strength has been calculated in the Sanitary Report at 356, with three deaths only, and two of which occurred out of hospital. For the above strength, 636 cubic feet were available, as a mean, in barrack rooms, and 443 in huts, wherein 104 men were quartered.

In the returns only seven cases of ague are represented to have been admitted to hospital in this formerly endemic locality, and the now comparative immunity from the disease is ascribed to the drainage of the neighbouring lands being carried out; in addition to which circumstance care was taken not to employ the men at practice after sunset or before sunrise.

Warley.—This station, formerly occupied by the depôt of the late the Hon. East India Company, was ceded to the Royal Artillery this year. Surgeon E. S. Fogo, of the corps, describes the site of the barracks as being of a considerable relative elevation and about 400 feet above the sea level, the position being on the southern aspect of the ridge of hills to the south of Brentwood, in Essex. The barracks, in their site, elavation, position, and general structural arrangements, he considers to be conducive to health.

The strength of Royal Artillery quartered here was of an average 685, and, with 12 men in a room, each had a cubic allotment of 537 feet.

The ventilation and warming of the rooms were good on the whole; but a representation was made by Mr. Fogo of the necessity for having ventilators placed in the side walls of all the lower barrack rooms, and his recommendation was acted on.

The ablution rooms are reported as being good, but without bath accommodation; a want also brought under representation.

In cooking appliances all was most satisfactory.

The water supply was good; and no exception was taken to that of the rations, further than a desire expressed that the grocery articles should be procured with the rest through the Government agency.

The duties admitted of nine consecutive nights in bed to each man on an average, and the employment of the troops was in every respect conducive to their health.

A large gymnasium had been organized under arrangements made by Mr. MacLaren, of Oxford, and was expected to be brought into use almost immediately.

The cells and lock-up room were pronounced to be satisfactory as to cubic space, warming, ventilation, and cleanliness.

The hospital, with an average of seven patients in a ward, afforded about 1,200 cubic feet to each; it possesses good baths and other satisfactory accessories.

Mr. Fogo's Report, in general conclusion, speaks very favourably of this newly-acquired station of the Royal Artillery.

LONDON AND DISTRICT.

The details given last year as to the metropolitan barracks, and the sanitary improvements effected in them by the Barrack and Hospital Commission during the three years preceding this (1861), leave exceedingly little to add in respect of further progress in such works, the leading measures of hygienic reform having been already effected in regard to the new system of artificial ventilation of the barracks, the institution of baths, and more commodious lavatories, the means of varied cooking, &c.

The Regimental Reports, on the close of this annual period, detail little variety from the points instanced in the last Department Volume. With regard to the average amount of cubic space per man in the barracks and hospitals, the frequency or otherwise of the night duties, the supplies of provisions, the conservancy arrangements, and the interior economy in the barracks generally, little or nothing of novelty or deviation from the conditions of the previous year is reported.

The Surgeon-Major of the Coldstream Guards has made a more pointed allusion to "a great improvement in the health of the men, and as being attributable to the attention now paid to sanitary laws, the condition of the troops being in such respect much ameliorated."

At *Windsor* no material measures of sanitary character were undertaken; and the occupation of each barrack (cavalry and infantry) was very much at the same average rates of cubic allotment per man which obtained for the preceding year.

At *Hounslow*, the head-quarters of the cavalry regiment in occupation to the end of the year, were afforded an average cubic space, for the months, of 488 feet per man.

The old barrack-rooms were undergoing alteration in being heightened, a measure which, with new and commensurate windows, and improvement

of the ventilation, was likely to render them as healthy as they could be made.

The Medical Officer in charge, on referring to the two new model troop-rooms, represents them to be well ventilated; but he states his opinion that one grate is insufficient to dry them after occasions of washing, at least, with sufficient quickness, and that it does not impart to so large a room the necessary amount of diffused warmth. Connected with these new troop-rooms, he reports the ablution accommodation to be very good.

The old regimental hospital being defective, and now inadequate to the requirements of the larger number of troops, the site for a new one came under consideration, and the question was referred to the Director-General, who pronounced his opinion that it should be selected within the barrack enclosure, and that the piece of open ground used as the barrack-master's garden would be well adapted.

COLCHESTER CAMP AND THE EASTERN DISTRICT OF ENGLAND.

The health of the troops at the camp (a large proportion of them being soldiers invalided from India, and young recruits) is reported by the Senior Medical Officer to have been good during the year; and, excepting pulmonary affections, to which the climate of this part of England may predispose, no serious disease prevailed to any extent.

The hygienic arrangements of the camp are pronounced to have been, in general, excellent. Occasionally the barrack huts were occupied to their full regulated number of 24 men—an objectionable restriction of cubic space being the consequence—but this necessity was rare, and 16 inmates to each hut was the rate of more usual allotment: thus the sanitary results became, on the aggregate, very satisfactory; and the mean monthly cubic accommodation for the two depôt battalions, comprising a strength of about 2,000 men, reached to nearly the new regulated standard for huts, of 400 feet per man in the annual average.

The facilities for the men's ablutions continued ample. Variety of cooking, however (and as adverted to in passing remark in the Report of the previous year), has been again represented very much a dead letter, to which sundry circumstances tend, as some extra expense to the men for baking flour, a limited coal allowance (in the hands of inexpert cooks), and the long habituation of soldiers to soup, leading them to prefer it in cold weather more particularly.

The conservancy arrangements of the camp were steadily fulfilled, the contents of latrines, ashpits, &c., being, under contract, carted away each night.

The only evil of any sanitary magnitude, complained of, appears to have been the condition of the surface drainage; and it was experienced to be defective, partly owing to the level of the camp area, and, in certain respect, the Senior Medical Officer appeared to think, to inequalities of the soil; also, in some measure, to insufficient slope towards, and narrowness of, the channels which empty themselves into the deep drains executed this year, and in which he conceived the current not to be sufficiently operative. Much of this, no doubt, would be found remediable.

Meanwhile no zymotic influences arose, to injure the health of the troops, from this source, and the drawback was more simply one of inconvenience and discomfort in times of wet weather.

Light duties and exercises of military instruction had full effect in keeping the men in health, and a round of from six to eight successive nights in bed told well in their favour.

The canteen system here, under a good contract, is specially noticed in the Reports as now excellent, the buildings being the only ones in the camp lighted with gas; their ventilation and warming being also good. These are points of no ordinary sanitary policy, to attract the men from otherwise resorting to the low and vicious grog-shops of the town.

The sections of the Reports on the camp hospital establishment add little or nothing of a variety in its condition from that of the previous year. The

ample cubic accommodation at disposal in these huts was greatly in favour of the recovery of the sick, the mean monthly space per patient rating at about 1,000 cubic feet.

Of the deaths under hospital treatment, only two are instanced as having arisen of the miasmatic order; but pulmonary consumption appears to have numbered as many as ten, whether specially developed by local climatic causes not being positively alleged in the Sanitary Reports.

Of the two stations in the Eastern District—*Norwich* and *Ipswich*—both were occupied, as in 1860—the former by the head-quarters of a cavalry regiment, the latter by a squadron of the same corps.

At both places the circumstances of occupation were very much those detailed in the previous Report, as to the available cubic space in the barracks, and in regard to the general sanitary conditions of their localities and precincts. In like manner it may be reported of the respective hospitals.

No material measures of sanitary character were in hand at either station.

THE CENTRAL AND THE MANCHESTER DISTRICTS.

Reference to the Annual Reports, of the several barracks which were occupied in these districts, elicits but a very great sameness of the conditions of their accommodation, for the troops, to such as were specified of them in regard to the preceding year.

In the former (the Midland) district no material improvements or alterations of a sanitary respect were made in the barracks or their out-buildings; and the stations of *Weedon*, *Birmingham*, and *Coventry* were occupied by numbers which, respectively, met with cubic allotment per man, in the rooms, of averages of 400 and 450 feet at the two latter, 650 to 750 having been available to each soldier of a detachment of 239 men at Weedon.

At none of these stations did any local sanitary drawbacks affect the troops: healthy military exercises, provisions of fair quality, and light night duties maintained a good salutary standard among them, leaving in the hospitals an ample residuum of cubic space in the wards for all ordinary wants.

Of the *Manchester* district the periodical Reports of the year were altogether favourable. The cavalry and infantry barracks at *Manchester* were occupied by a regiment each, and at the rate of an average of 486 cubic feet a man in the former, and, apparently, from the Return, of 545 in the latter; the hospital averages of occupation, having been 1,300 cubic feet to a patient in the infantry corps, and over 1,000 in the cavalry regiment, speak well for the general health enjoyed by the men of each, in showing that no necessity for overcrowding took place.

At the Fulwood barracks, *Preston*, the depôt battalion averaged for the year about 800 men in the barrack-rooms, at the ample mean monthly accommodation of full 600 cubic feet to each.

The hospital accommodation here, however, and as usually the case in reference to the proportionately large recruit class of a depôt battalion, afforded not more than about 800 cubic feet per patient, in mean annual rate.

The water supply for these barracks was, latterly, abundantly added to by a flow laid on from the public reservoir.

THE YORK DISTRICT.

Great and important additions were made this year, under the auspices of the Barrack and Hospital Improvement Commission, at *York*, by the construction of new troop-rooms and stables, to meet the accommodation of a complete regiment of cavalry of the present established strength. The arrangements, in all sanitary respects, connected with these extensive works are well described and practically commented on in an excellent Report by Dr. Fraser, Surgeon of the 10th Hussars, the corps in occupation this year.

As much of structural and general sanitary interest attaches to this new order of cavalry barrack accommodation and arrangement, certain descriptive details may be acceptable on the present occasion.

Dr. Fraser reports the completion of three new blocks of building this year. The first of these is a two-storied one, which is divided into 46 married men's quarters, equally distributed between ground and upper floors, each quarter consisting of one room, 1,920 cubic feet in size, well lighted and ventilated, and provided with every convenience for private cooking.

The other two blocks are likewise two-storied edifices, but the first-erected of these is constructed for the occupation of troops solely, whereas the ground-floor of the third is constructed as a stable, and the upper storey of it for the accommodation of the men. The former of these last two buildings is divided into four large troop-rooms, and four non-commissioned officers' quarters—two of the former and two of the latter on each floor. On either side of the entrance (which is at the centre of the building), and of the landing on the upper floor, are, first, one room for a non-commissioned officer, and then the troop-room, extending the whole length of the rest of the building. Each of these troop-rooms measures 60 feet by 20, and is capable of accommodating 24 men, giving 600 cubic feet of space for every bed. These apartments are reported to be thoroughly ventilated, both by well-sized windows on their opposite sides (four on each), and other efficient measures; but the means for warming them appear to Dr. Fraser to be defective. For the latter purpose, he states, they are provided with only one large American stove grate, in the centre of each, and fixed against one of the side walls. If this gave out sufficient heat to warm the far end of the room (60 feet in length), the immediate vicinity of the stove might be expected to be over-heated; this he has heard no complaints of, but the former it is said to fail in effecting. In the case of apartments of this length and construction, with such thorough means of ventilation as these have, he concludes that the heat of two smaller stoves, properly distributed, would not be found too much, and would diffuse a more equable temperature, materially increasing their comfort.

At the further end of these rooms, and entered directly from them, is arranged an ablution-room, added on, as it were, to the main building. It is furnished with a sufficient number of basins, and abundantly supplied with water; but has neither a bath nor any other means for the fuller ablution of the person. It is also provided with an urinal, for use instead of the old urine-tub—a vast improvement, yet, here, from the position it occupies in the most distant part of the ablution-room, found not to be so advantageous nor free from objection as it otherwise might have been; every care and precaution, however, appear to have been taken to obviate the possibility of its proving offensive. It is so constructed that a full supply of water may be constantly flowing through it; and, further, the pipe leading from it is trapped. Adverting to the use made of the urinal, Dr. Fraser thinks it must have been over-looked that the men would have, in the night, to grope their way to it in the dark, over a sloppy floor, probably bare-footed, from their beds, and that, being a small object, even a sober man might have some difficulty in making proper use of it; but, as it is, the case is worse when the man happens not to be sober, or is careless and unwilling, and cannot or will not find the trough of the urinal. From whichever cause, a nuisance is frequently found to be the case, and the consequence is that the ablution-room is often in an offensive state. Dr. Fraser had called attention to this objectionable condition, by representation in the proper quarter; and he states that these ablution-rooms would be a great convenience and comfort to the men, if they could only be kept in proper order; but that they form the common receptacle of all sorts of articles, for the keeping of which no other provision has yet been made—such as pails, tubs, mops, scrubbing-brushes, &c., for which very necessary utensils some distinct and suitable place should be assigned. Unfortunately, too, it is found a difficult matter of discipline, notwithstanding stringent orders, to prevent both urinals, and the bath-rooms generally, being used by the men to a certain extent, as a "sink," the consequence of which is, that the urinal-pipe gets sometimes choked with tea-leaves and other matter, it being almost impossible to prevent the men from taking whatever means appear readiest save themselves any extra trouble of carrying further away.

With the foregoing exceptions of warming, and objectionable condition of the ablution apartments, Dr. Fraser is of opinion that the rooms of this first block of new buildings answer well in a sanitary point of view. They are large and thoroughly ventilated, have a favourable aspect, the range running nearly in a line due east and west, and thus facing a little to the west of due south, by which arrangement both sides receive, though not an equal, a fair proportion of sun-light, so important to their salubrity.

With reference, next, to the third new block of buildings, Dr. Fraser describes it to be on the opposite, or north side of the barrack-yard, both the other two being on the south. This block is on an entirely different plan from that just described, the men's rooms being, in accordance to old custom, over the stables, one long range of a stable extending from end to end of the building longitudinally. The rooms are eight in number for the troops, and four for non-commissioned officers; one large ablution-room is provided, and two store-rooms. Each troop-room measures about 35 feet by 28, is capable of containing 17 men, and calculated to afford 600 cubic feet to each of that number. The whole block is thus allotted to 140 men, including the non-commissioned officers.

The troop-rooms of this block are lighted by two windows on each external side, which serve also in considerable degree for their ventilation; but a free circulation of fresh air is further ensured by ventilators in the roof, and in the walls over the windows—the latter so constructed as to be made use of only when considered necessary, and then very properly placed beyond the possibility of interference from the men by the use of locks and keys. These rooms, Dr. Fraser thinks, are warmed sufficiently, and, owing to their configuration, equably by one "American stove grate." In consequence of the deficiency of the old hospital to accommodate the sick of a complete regiment here this year, he had of necessity to appropriate two of these new troop-rooms as wards for sick, and, from thus having them constantly under special observation, has been enabled to report them as having been always fresh, sufficiently warm and comfortable, even in very cold weather. As to the non-commissioned officers' rooms, however, in this building, he deems them to be disproportionately and over-ventilated, the apparatus, both in the roof and walls, being exactly the same in dimensions as that of the troop-rooms, which are double their size.

In further detail, Dr. Fraser states that these rooms are entered from a verandah, six feet wide, which extends the whole length of the building, on its southern aspect, and serves as a shelter from sun and rain: a flight of stone steps at each end of the building leads to the verandah. Each troop-room is provided with an urinal placed outside of the building, but to which access is obtained directly from the room by a doorway. To these urinals the same objection is not taken as to those of the other block of men's rooms, in respect of being difficult to reach in the dark, as they are so near at hand that they could scarcely be missed even by men not altogether sober. Dr. Fraser, however, suggests that their troughs should be larger, considering how desirable this is for the use of men so careless of their own comfort as soldiers are well known to be. These urinals are similar in construction and design to those of the other block, and, with a constant flow of water through them, should not be offensive; but, though very much less so than the others, still they are found to be so to a certain extent, a circumstance attributed, partly at least, to abuse in the men making use of them as "sinks;" and here Dr. Fraser observes that the men have no excuse, as a proper sink, though at some distance, is provided for this block of buildings, and which is not the case as to the other. Sanitary discipline, up to the refinements now afforded him, is yet a difficulty in the soldier's nature.

To this new block of barrack-rooms (over the stables) there is only one ablution-room; it is placed conveniently, however, in the centre of the building, on the same floor with them,—is large, commodious, and furnished with a long, double range of fixed wash-hand basins, abundantly supplied with water laid on by a separate tap to each, the waste being readily removed by a simple arrangement; but no bath or means of thorough ablution is yet provided, a want which it is very desirable should be supplied, as it is stated the space in the ablution-room would conveniently admit of its being done. Every precaution is said to have been taken against the possibility of any emanations reaching

the rooms from the stables beneath, by the ceilings of the latter being made impervious to air, and underneath the floor of the rooms there is laid a thick covering of asphaltic composition—measures thought to be attended with complete success. In a sanitary point of view, however, preference must undoubtedly hold in favour of the men's quarters being in every way detached from the stables, although these last-described rooms afford a vastly improved accommodation to that of the old conventional form of a cavalry barrack, and present an air of comfort greater than the rooms of the other new block are thought to do, on account of the large size of the latter; for, as Dr. Fraser describes, where there is a large number of men placed in one room, they remain in it much less than in a smaller one, which has more the appearance of the comfort of a home, with greater peace and quiet than can obtain among the constant traffic of many occupants. The remark is, indeed, one of a practical observation among military men.

The entire system of drainage of the York barracks and their grounds continued under process of improvement on a main and extensive scale this year.

In prospect of the completion of a new and model hospital, on a better site, for the troops at this station, no further reference need be made to the old one in present use.

Of the stations of *Leeds* and *Sheffield*, the conditions reported last year apply to this, with so little variation, that it is unnecessary further to refer to them on the present occasion.

The barracks at *Newcastle* were occupied for a portion of this year by the head-quarters of a regiment of infantry.

Their position is a healthy one, and detached from immediate vicinity of the town.

The men's rooms afforded the average rate of 550 cubic feet of space per man in the distribution of the strength.

The ablution accommodation sufficed, the means of cooking served for variety, and the water supply was afforded from the town works.

The ventilation of the hospital wards had lately been brought under the improved artificial system; but a still great deficiency stood over at the end of the year, in there being no bath or ablution-room provided for the establishment.

NORTH BRITAIN.

The sanitary conditions of the barracks and hospitals in Scotland varied little this year from those detailed of them in relation to the preceding annual period. The main improvements of the Barrack and Hospital Commission, as regards the new system of artificial ventilation, &c., had been generally effected, and the sanitary reports for 1861 convey few remarks of further hygienic importance.

At *Edinburgh* the corps quartered in the Castle appears, from the regimental report, to have had in average of accommodation per man a mean monthly rate of 450 cubic feet in the barrack rooms; but for a detachment at Greenlaw 385 only are so reported. Continued objection was made by the surgeon to the lock-up room in the Castle, on account of its ill adaptation on sanitary grounds; but this was only one of many such defects of the barrack accommodation of the Castle at large, and which are admitted to raise the general question of new structures to meet the advanced requirements of the day. In the old and defective Castle hospital the wards had occasionally to be overcrowded, but, for the annual average of cubic space accruing per patient, 900 feet are given as the mean of the monthly rates.

A proper lavatory, with a fixed bath, was much desired for this establishment, and was expected in supply among the works of the next financial year.

The hospital water-closet cylinder, as carried down the side of the rock, was found to act as a sewer-gas shaft from the mains of the town below, but the evil was remedied by proper trapping.

At *Piershill*, Edinburgh, the cavalry regiment obtained cubic allotment per

man in the barrack rooms at the average rate of 486 feet, and the ratio for the sick in hospital, although much below the new standard of 1,200 feet, appears to have created no prejudicial effect in the treatment of disease of any kind. The enlargement of the guard-room recently, and the effective mode of its ventilation, are very favourably spoken of by the surgeon ; but he had occasion to represent, through the Commanding Officer, the inadequate ventilation of the regimental cells, and the case awaited result.

In *Leith Fort* no sanitary ameliorations were effected, this year, of any considerable degree. The barrack accommodation remained as defective and limited, affording to a battery of Artillery a range only of from 325 to 480 cubic feet a man.

The fortunately healthy condition of the men, however, left an available average, in mean of the months, amounting to 1,557 cubic feet per patient in the hospital wards. In ablution, cooking, and bath accommodation deficiencies still existed in this establishment.

Glasgow.—The report on the Infantry Barracks assigned an average of 460 cubic feet a man in the rooms to an average strength of 455 rank and file, and bespoke good health of the corps in showing an average rate of only twenty-three daily sick, amply accommodated in hospital with 1,533 cubic feet of ward space each. This state of health, taking into consideration the insanitary surroundings of these barracks, was not a little attributed to the companies being detached to Ayr for rifle practice during the term of a month each.

Stirling.—The depôt battalion at this station averaged a strength of only 452 men, accommodated in the barrack rooms of the Castle, and the assigned cubic space to them was 430 feet per man.

There is little of general sanitary interest or variation from the conditions of the preceding year to report. An improvement was effected in the ventilation of the "Barrier" guard-room. The water supply to the garrison was secured in more ample and certain quantity than had been hitherto afforded from the Town Works. On account of that source proving irregular, the expedient was resorted to of constructing a force-pump in the moat of the fortress, and, from a spring there, raising a volume to a tank within theCastle ; the subsequent supply proved satisfactory, the quality being reported good.

With regard to the hospital, the old "Argyle House," its drainage at the beginning of the year was represented to be in a bad state, and the water-closets and latrines were reported to be defective, on both accounts owing to irregular supply of water. To meet these evils a cistern (capable of containing 300 gallons) was placed over the bath-room, for the general purposes of the hospital, after which the entire supply became quite satisfactory, and the evils remedied. A drip pipe was also added to the hospital urinals.

The health results of the year, in general respect of the troops, appear to have been very favourable, indicating good sanitary superintendence and freedom from heavy duties.

At *Aberdeen* the depôt battalion numbered an average annual strength of 468, with a proportionate mean of 440 cubic feet of room space per man ; the hospital accommodation, in similar respect, giving 989 feet per patient to an average daily sick list of 19.

A new bath room for the hospital and, also, a new pack store were services reported as much required.

Fort George.—This station was occupied by a small detachment, 116 in average strength, from the depôt at Aberdeen, and the men had the full complement monthly of 600 cubic feet each in the barrack rooms. Of the above strength the average daily sick appears to have been five, to meet whose accommodation the rate of 1,500 cubic feet to each patient was made avail of.

Sundry drawbacks, in a sanitary respect, are represented as requiring remedy, more particularly that of a nuisance in the effluvia from latrines, &c., connected with the still existing old cesspit system, the drainage also being very imperfect, and, although frequently so represented, little having been as yet effected in the way of its improvement ; in such respect the position of the fort may have presented some obstacles. The medical officer estimates the elevation at only about 12 feet over high water mark—the site being on a "spit" of shore.

IRELAND.

The Inspecting Medical Officer of the *Dublin Division*, Dr. Clerihew, reports the health of the troops generally to have been good, but instances exceptions in respect of two corps which served under his immediate observation—the 1st Battalion of the Rifle Brigade, and the 87th Royal Irish Fusileers.

He has attributed a comparatively large amount of sickness in the former to the enlistment of undersized men, and to the more severe nature of the duties of riflemen on the field-days of military instruction; while, in his Sanitary Report, he has more particularly pointed out the prevalence of heart-disease in that battalion—a circumstance which he assigns to the men having, on the above-stated occasions, to run at rapid pace when heavily weighted.

The 87th landed this year from China in a sickly state, many men suffering from visceral disease, the effect of Eastern service and tropical fevers; ophthalmia being also prevalent in the corps.

In regard to the several barracks and hospitals of the Dublin Garrison, there is little to report this year as to any material change having taken place in their conditions of ventilation, in the state of their outhouses, latrines, &c., of their kitchen arrangements, the supplies for the troops, the nature or frequency of their duties, or other general hygienic considerations adverted to in the preceding year's volume. The main sanitary works of the Barrack and Hospital Improvement Commission had then been mostly effected.

Neither of the *Northern Military District*, also under the superintendence of the Deputy-Inspector-General of Hospitals attached to the Dublin Division, is there represented in the Reports, Regimental or Depôt, account of any material addition this year to the sanitary services executed up to the period of the preceding.

Of the *Curragh Division*, the Principal Medical Officer, Mr. Lawson, Deputy-Inspector-General, assigns the average annual strength to have been 5,818, of which the average number of sick was 50·7 per 1,000, and the death-rate so very low as 4·64 per 1,000 per annum.

Duties.—Mr. Lawson states that some of the Cavalry Medical Officers complained of the constant occupation of the men of that force in camp; but, though so fully occupied, his opinion was that their exertions were less than would have been required of them in most occupations of civil life; and their health, he observes, evidently did not suffer in any corresponding degree. For some time, at the Curragh, these troops certainly were much exposed to continuance of a rainy season, their clothes being scarcely properly dry for days together. But sickness, nevertheless, appears to have been greatly exceptional among them, as attributable to the exposure.

Tents.—The cotton tents were complained of as admitting water when the rain beat on them; but, as their issue came to be condemned, further reference to them has been withheld.

Barracks, Huts, and Hospitals.—The accommodation in the barracks (*Newbridge*), in the huts of the camp, and in the hospitals generally, the means of ventilation, those of ablution, the cooking conveniences, the composition and quality of the ration, as also the clothing of the troops, the Principal Medical Officer reports, in general terms, to have been very similar in circumstances and condition to those given in his Report for the preceding year.

Clothing.—Upon the subject of the clothing of the soldier, as a general question, Mr. Lawson represents, in further expression of his opinion, that it would be well if it could be so arranged that, when the tunic is removed, some under garment should remain over the chest and back, in addition to the shirt which is then insufficient to afford the requisite protection. Beyond its general range, the question is still the more worthy of consideration in its bearing particularly on the health of troops under canvas.

Improvements.—With respect to the Curragh Camp, some improvements were this year effected in the outlets of the superficial drains, by which collections of water were conveyed away and prevented from stagnating near the men's huts.

A main drain was cut through what is called "Donnelly's Hollow," the

situation occupied by a portion of the Cavalry and Artillery for encamping, to run off the water which systematically accumulated there after heavy rain-falls. As portions of this drain were of considerable depth it was necessary to cover them over, and loose stones were arranged in course of it with a view to counteract the effects of silting, the soil in some places being loose and sandy. This measure, however, soon proved ineffectual, and it was found requisite to re-open and to substitute nine-inch glazed earthenware pipes.

The system of sewerage recommended by the Barrack Improvement Commission for *Newbridge* Barracks was completed. It is represented to have proved efficient; and the Principal Medical Officer observes that the surface drainage would be improved also by carrying out their recommendations in regard to it.

The Southern or Cork Division.—The Report of the Senior Medical Officer at Cork, on the termination of the year, specifies as to the ventilation and warming of the hospital at *Ballincollig* having been most satisfactorily completed by the introduction of the new grates and the artificial system of ventilation; also as to the introduction of pipe-water into the General Hospital at *Queenstown;* and of some minor improvements at stations here and there. The main desideratum still left throughout the Division, generally, he represents to be that of sufficient lavatory and bath accommodation.

Reviewing the whole of this Division, there is little to observe this year in any material respect differing from the details of the local Reports of 1860, in regard to the composition of the force, the average of strength and relative cubic accommodation in barracks and hospitals at the various stations, in the duties, provisioning, or other sanitary circumstances bearing on the welfare of the troops.

The views of the Inspector-General of Hospitals, Mr. Williams, with regard to many general and certain local requirements for the social and sanitary interests of the troops in Ireland, are to be gleaned from the following extracts of his Sanitary Report for the year under review:—

"The health of the troops in Ireland does not appear to have been affected during the past year by any particular cause. The troops have generally enjoyed good health, and the ratio of mortality of those who died in hospital is only 5¾; but, if the deaths of those who died out of hospital are added, the average will be 6·25 (nearly) per 1000 of mean strength.

"I have in my Inspection Reports suggested many things which I trust will be found calculated to improve still more the health of the troops, and I beg to mention the general requirements for nearly all stations, and also those recommended for particular barracks, all of which I hope have been included in the estimates for the next year, as I submitted them last April to the General Commanding in Ireland for his approval, with a view to their being inserted in the Annual Estimates.

"1st. Quarters for married soldiers, which, if sanctioned, will liberate many barrack-rooms, and give the soldier an approximation to the space considered necessary for preserving him in health.

"2nd. Hospital accommodation for the sick women and children of soldiers.

"3rd. Day-rooms for the men.

"4th. Day-rooms for convalescents in hospital.

"5th. Gymnasia.

"6th. Covered racket-courts.

"7th. Covered skittle-alleys.

"8th. Drying-room to be attached to women's washhouses, and in hospitals, for airing clothes. An excellent specimen of the kind required is to be seen in Limerick Provost Establishment.

"9th. All cesspools to be entirely done away with.

"10th. Standing ash-pits to be abolished. Iron carts (numbers according to requirements of barracks) to be substituted, and cleared out every morning.

"The hospital at Birr is not large enough; it is recommended that it should be enlarged, or a new site chosen for a larger and better one.

"The hospital at Buttevant is too small for the usual strength of the station. Recommended to be enlarged or a new one built.

"According to present regulation, giving 1,200 cubic feet per man, the hospital at Cahir will only accommodate 17 patients; accommodation for at least 36 should be provided.

"A new hospital for the Artillery at Limerick is much required, or wards should be added to the "New Barrack Hospital," for the treatment of the sick of the Royal Artillery.

"The partition of the staircase in the hospital at Newry should be removed, and rooms adjoining the hospital be converted into additional accommodation for the sick.

"The hospital at Templemore, intended for 80 patients, according to the new regulation has barely accommodation for 40. It should therefore be enlarged.

"The Infantry Hospital at Waterford is so deficient in every necessary accommodation, that a new one ought to be built.

"Improvements, according to the recommendations of the Sanitary Commission, have been slowly introduced into a good many of the barracks; but I regret to say, Cork, Belfast, Waterford, Dundalk, Newry, and Kilkenny, are still unimproved. It is only by degrees, however, these works can be expected to be carried out; but, when they become completed, better ventilation, increased space, additional means of cleanliness, improved sources for exercise (even in wet weather), the immediate removal of all refuse likely to prove injurious to health from remaining for days or weeks, or sometimes even months, in those disease-engendering receptacles (cesspools and ashpits), which I trust ere long will be completely done away with,—will prove these works to be the cheapest ever undertaken by Government; as it is confidently anticipated disease will be greatly lessened, and mortality vastly diminished; and I may here remark, that the greatest number of deaths during the last year occurred at stations where as yet the recommended sanitary improvements have not been carried into execution."

THE CHANNEL ISLANDS.

The circumstances of the Channel Islands, in the sanitary question of their military posts, remain so much *in statû quo* of the preceding year, that any detail of report at the present time would but involve repetition, and unnecessarily. No sanitary works of any considerable importance were, at any station, brought into execution; many requisite ones at almost all the barracks await the solution of ways and means.

The Annual Sanitary Reports give so far favourable results to health, under not a few adverse conditions of barracks and hospitals still existing, as regards limited cubic space, inadequate ventilation, bad drainage, insufficient ablution and bath accommodation, and other kindred hygienic bearings.

In *Jersey*, at the station of St. Peter's, a Commission, or Board, sat to consider the entire system of drainage connected with this post; and their inquiry led to a condemnation of the whole existing means. Their investigations revealed a most obnoxious nuisance of an open cesspit within a hundred yards, as stated, of the hospital. Its site was found to be on private property, and it had been the receptacle for years of the barrack-soil. This nuisance was duly proceeded against, the accumulations were caused to be removed, and the use of the pit discontinued.

From the result of the Board's inquiry, an entirely new system of drainage here was anticipated.

With the available ways and means of the year, progress was made in furnishing the new scale of hospital equipment, and the following stations were, more or less, so supplied:—

Chichester.
Preston.
Dover.
Stirling.
Norwich.
Aberdeen.
Canterbury.
Aldershot.
Portsmouth.
The Curragh.
Bradford.
Newry.
Belfast.
Newbridge.
Woolwich.
Yarmouth.
Manchester.
Devonport.
Athlone.
Coventry.
Birmingham.
Colchester.
Maidstone.
Sheerness.
Sheffield.
Shorncliffe.
Pembroke.
Fermoy.
Chatham.
Warley.
Portland.
Weymouth.
Dorchester.
Exeter.
Dublin.
Birr.
Templemore.
Mullingar.
Jersey.
Guernsey.
Alderney.

Foreign Stations.

Gibraltar.
Malta.
Bermuda.
Canada.
New Brunswick.

GIBRALTAR.

The Principal Medical Officer has not failed, in his Report for 1861, to reiterate his representation on the very many sanitary defects bearing upon the condition of this large garrison, numbering between 5,000 and 6,000 men. The projected improvements and measures emanating from the visit of the Sanitary Commissioners were awaited.

State of Barracks, &c.—During this year under review the barracks occupied by the several corps were, as a general rule, overcrowded; the want of accommodation, however, continued to be supplemented by encampments as far as practicable.

The state of ventilation, in the very great majority of the barracks, remained defective; and, in the bomb-proof structures, of which there are a great many in the garrison, this defect was, of course, most prominent. In as far as possible, and under vigilance, the ventilation was attended to, and the several barracks were maintained in cleanliness. The guard-rooms have been more favourably reported on by the Principal Medical Officer, in contrast with the barracks, as being sufficiently spacious—likewise the barrack-cells, which are never used but for short periods of confinement, or when the Military Prison is not capable of receiving all prisoners of the garrison.

State of Latrines, &c.—The state of latrines, urinals, &c., required strict supervision during the year. Throughout the garrison these are either so badly constructed, or wanted means of sufficient flushing, that they could not be kept in the satisfactory order which was to be desired. All ashpits were emptied daily; and in the different barracks, as a general rule, iron boxes were placed to receive the refuse to be similarly disposed of.

Means of Ablution.—The ablution-rooms for the troops, as hitherto, were all devoid of the main requisites for any thorough personal cleanliness, not a bath-room yet existing in any barrack of the Command.

Drainage and Sewerage.—The drains and sewers throughout the garrison became in no respect improved, defective as they are from original mal-construction, and generally from want of a sufficient momentum of water-supply for effective flushing purpose. Only during the rainy season, a period but of short duration, does there exist an adequate agency to dispel their contents, which, for other months of the year, must accumulate in obstructions, developing gases to taint the surrounding atmosphere.

The Principal Medical Officer, Mr. Paynter, Deputy Inspector-General, in his Report, dwells emphatically on this paramount odium of the garrison; but states that every care had been taken to keep the vicinity of the several barracks in as good sanitary a condition as constant attention and means admitted.

Kitchen Accommodation.—With reference to the means of cooking and the condition of the barrack-kitchens, the general Sanitary Report of the garrison but repeats pre-existing wants. With a solitary exception, one uniform system, and admitting of little variety, prevailed. The exception refers to an apparatus introduced at the "New Stone Hut Barracks," at Europa Point, since last year. This (Benham's patent) proved a great improvement on the old kitchen boilers still in existence throughout the rest of the garrison.

Rations.—In the provisioning of the garrison there occurred no failure of supplies, and the rations for the troops throughout the year are reported as having been good.

Water Supply.—The rainfall appears to have been large during the autumn and winter months, such as fully to store the garrison tanks; but an amplification of these is a desideratum to meet the necessities of the garrison.

Clothing.—In referring to the clothing of the troops, Mr. Paynter advises the wear of flannel next the skin for the men, as a general rule, and adapted specially for the climate of Gibraltar. The newly-instituted light suit for the hot months had not been furnished in time for the season of this year.

Duties.—The duties, garrison and regimental, do not appear to have exercised any unfavourable influence on the health of the troops, the average number of nights consecutively in bed having been about four in the Infantry Brigade, and five in the Royal Artillery; twenty-two falling to the welfare of the Royal Engineers.

Hospital Accommodation.—As regards the Garrison Hospital, the ward-accommodation appears to have sufficed well this year, the state of the ventilation being generally favourable for the numbers sick. There were no circumstances in course of the year to necessitate any overcrowding, and hospital marquees were resorted to whenever demand for increased cubic space arose. Save in respect of its wards, the report of the year but reiterates the leading defects of the hospital which have existed *ab initio*, and have now led to the intention of remodelling and organizing it wholly upon the principles of a general hospital, in conformity with the new regulations.

MALTA.

The General Report of the Principal Medical Officer intimates that the new stone barracks at Pembroke Camp, St. George's Bay, were completed this year, and occupied by troops.

These barracks, situated about four miles from the town of Valetta, and in one of the most salubrious localities of the island, are ranged in six "block" buildings, looking south-east and north-west, four composed of fourteen rooms, and two of seven. Each room is constructed to hold 14 men, at the full amount of 600 cubic feet of space to each individual. The rooms are represented to be airy, well ventilated, and thoroughly lighted. In front of each block extends a verandah, supported on pillars and arches. A spacious mess-room and quarters for 30 officers are provided. The drainage is reported to be good, and the means of ablution ample; the men having, also, an especial facility for sea-bathing during the summer months. The system of latrines attached to these new barracks is approved of; but Surgeon-Major Langley, Principal Medical Officer, takes very positive objection to that of having an urinal placed in a corner of each room, it gives occasion to frequent complaints, in consequence of the foul and ammoniacal emanations experienced; and he observes that, although the urinals were only intended to do away with the old system of night tubs, yet a disadvantage remained in it being found impossible to prevent the men using the room urinals by day.

The kitchen accommodation provided is reported on favourably, but without details being given.

In further respect of this new station of the island, mention is made of six large and commodious huts which have been erected, adjoining the Stone Barracks; they are capable of containing 50 men respectively, affording cubic space to each at the rate of 470 feet; there are also huts for 16 officers.

The total amount of accommodation at this new post is for nearly 1,300 rank and file, and it must, in sanitary respect, prove a valuable relief to the hitherto densely-packed garrison of Malta.

During the winter months the Pembroke Barracks are occupied by detachments from the different regiments, for the purpose of rifle practice; and, throughout the hot season of this year, a wing of the 2nd Battalion of the Buffs occupied them with great advantage to their health.

In the garrison of *Valetta* itself, additional accommodation for the troops was afforded by the erection of two large wooden huts at Upper St. Elmo, each of them adapted to contain 56 men. They were much required, for the barracks, generally, throughout the garrison are imperfect in their means of ventilation, limited in respect of cubic space for the strength of troops in a climate of the kind, objectionably situated for their health as an especial question, and have imperfect drainage.

Considerable improvement having been effected in 1860 in the rooms of the Lower St. Elmo Barracks, by the introduction of upright air-shafts opening on the roof, and of perforated zinc plates in each window, the good effects of the measure were, in the opinion of Dr. Langley, evidenced by the excellent health enjoyed by the battalion which occupied them during 1861.

Of *Florian* Barracks, situated without the fortifications of Valetta, the sanitary condition is represented as having been very bad in regard to the ventilation, their position, sanitarily speaking, being radically objectionable, on account of the buildings being on one side immediately under a large civil hospital, the drainage from which passes through their area, whilst on the other side they

are in close proximity to a large poor-house: under such circumstances it is not surprising that fever of low form should prevail, as Dr. Langley states, to a considerable extent here. In two of the barrack-rooms much improvement was obtained by piercing openings on their north-east exposure, a measure which was looked forward to for the others before the accession of the next hot season; but, in the opinion of the medical officers, it is almost beyond hope that the present barrack can ever be made a good one. On this point, Mr. Adams, Surgeon, 1st Battalion, 22nd Foot, writes, "I fear this barrack will fall short of ever becoming a healthy quarter for troops; it can scarcely be expected that buildings originally constructed as naval storehouses should have anything in common with habitations for the health and comfort of 450 men: the height and length of the rooms are out of all proportion to their breadth, insomuch that with 46 men (the regulated number occupying each), although the cubic space is about 600 feet per man, the superficial is so small that there is little more than 13 inches between each bed."

With reference to the barrack accommodation in the *Cottonera* District, it is shown that an increase was this year obtained, and for about 350 men, by taking into occupation certain quarters previously in use as ordnance stores, and also the new casemated barrack at St. Clement's, adjoining Fort Verdula.

The former consist of a range of casemated rooms situated within the fortifications, considerably elevated, and thought fairly ventilated by means of shafts through the roofs, and of doors and windows. Overcrowding in these buildings was avoided, and their drainage and sewerage were good. The St. Clement's Barrack is also a casemated one, in hygienic situation objectionable, occupying "a low, sunken position, surrounded on all sides by high walls, in the summer months preventing a free current of air, and in the winter being conducive to damp;" the drainage and ventilation, however, are stated to be as effective as the site admits.

Reviewing the condition of the Malta barracks generally, Dr. Langley remarks, as others have done, that, being throughout the command within the lines of fortification, old structures by the "Knights," and connected with the defences, nearly all are unfavourably circumstanced for the object of health; that, being ill ventilated, and often damp, much of the disease which occurs in the garrison is engendered by them. Consistent with their present construction, although capable of much improvement, it is thought they never can be placed on a high sanitary footing suitable to the climate; and he advances for consideration, whether the erection of quarters outside the walls, for occupation in time of peace, would not be attended with satisfactory results in the end, not only in a sanitary, but also in a financial view. The results at Pembroke Camp for the year, as compared with the interior garrison stations, confirm his belief in this.

Married Quarters.—The social condition of the married soldiers has been such as to call for great improvement, the only accommodation yet afforded them being in associating several families in one room, their only privacy obtained by the expedient, alone to be adopted under the circumstances, of screening off their respective portions of the apartment by some slight means, a provision interfering with the course of ventilation. During the year steps were adopted to remedy partially the evil arising from want of this special accommodation, by taking into use a number of small rooms on the Cottonera side, whereby each family in this part of the garrison became provided with a separate apartment; but these rooms are said to be ill adapted and badly ventilated, in some instances being lighted and ventilated by the door only. But, no doubt, the day is not distant when the Government will equally provide special married quarters here, as they have been systematically doing at different stations in the United Kingdom.

Hospitals.—The circumstances of this accommodation remained unaltered this year, and the ward space, generally, was sufficient for the necessities. A new General Hospital for the Valetta side of the harbour may still be *in prospectû*. With reference to the present extremely badly-situated one, certain improvements recommended by the Sanitary Commissioners, who visited the garrison in November, were put in progress of execution. They consist in the removal of all projecting buildings calculated to interfere with a free circulation of the air, the construction of new and improved urinals,

and the introduction of air-shafts for the latrines. The old bath-rooms have been removed, and commodious new baths fitted up; these are screened off from each other, and are provided with a supply of hot and cold water. The ventilation is likely to be much improved by more windows being pierced in some of the most ill ventilated wards. It had also been suggested to open out the eastern wall, and form a verandah facing the grand harbour, a measure much desired, and likely to be attended with most beneficial results to the health and comfort of the inmates of the hospital, by admitting a free current of air into the wards of the lower square, and by affording more extended space for the exercise and recreation of the convalescents. The foregoing measures will be of great benefit and utility for the interests of the sick, but the Principal Medical Officer records his firm opinion that the utmost improvement to be effected will never render the present edifice well adapted for its purpose, on account of its singularly faulty site.

The "*Forrest*" Hospital is situated about three miles from Valetta, and half a mile from Pembroke Camp Barracks; the edifice was originally constructed for a suburban residence of one of the Grand Masters. In October 1860 it was opened, after considerable modification, and many improvements, for the use of the troops at the camp. It is represented to be well suited for the treatment of the sick from the neighbouring barracks at Pembroke, and also adapted as a sanatorium, for which latter purpose it was, to a considerable extent, used during the summer months of this year. It is considered, in all respects, one of the best hospitals in the island, and is placed in a salubrious situation, exposed on all sides to the fresh and invigorating sea breezes, possessing also the further advantage of a ready access to sea bathing—a resource which, it is reported, proved of the greatest benefit in the treatment of many of the cases which were sent to it, and which, had they remained within the garrison, must have proved very protracted. For chest affections, the site of this hospital is pronounced more particularly beneficial, and better suited to their treatment than the locality of the Sanatorium at Citta Vecchia.

The Sanatorium at *Citta Vecchia* is reported to have realized fairly the good results expected from its institution. During the summer months it afforded considerable relief to the regimental hospitals, and proved of special value in fever cases, rendering their convalescence much more speedy, and, in many instances, doing away with the necessity of invaliding the men to England. Surgeon-Major Mr. Matthew, the medical officer in charge of this establishment, speaks most favourably of the fortunate results in this class of disease. His special report on the Sanatorium, for this year, will be found in Appendix, affording much of interest.

The duties of the Malta garrison were often of a heavy description, by day, consisting, in addition to the usual military exercises, of fatigues for the purpose of mounting the new guns of the fortress, loading shot, shell, &c. Although these duties, combined with the other garrison and regimental ones, were, on the whole, arduous, they do not appear to have exercised an injurious effect upon the health of the troops.

Upon other subjects connected with the health of the garrison, as the provisioning, water supply, ablutionary accommodations, cooking conveniences, and kitchen arrangements at the various barracks, drainage, latrine system, &c., no material or general improvements appear to have borne reference to this year.

Gas was introduced into the Lower St. Elmo Barracks, and at the Florian pipes were in progress of laying for similar purpose. In all the other barracks the old oil lamp was still the only luminary. A provision for warmth, as well as light, for the barrack rooms is again advocated, many of them being damp and cold in winter. Upon this question the Principal Medical Officer observes that, during the long winter nights, many men who, if increased warmth and comfort were extended to them, would find amusement and occupation in their rooms, are, from their cheerlessness, driven to the neighbouring grog shops, and fall an easy prey to the various temptations and vices prevailing among portions of the civil population, intermixed with a large force of soldiers and sailors at the Station.

IONIAN ISLANDS.

[The Annual General Report rendered by Dr. Francis Innes, C.B., Deputy-Inspector-General, is so comprehensive, as regards the sanitary interests of the troops, that it is desirable it should be published in full.]

General Sanitary Report on the troops serving in the Ionian Islands Command, for the year ended 31st December, 1861, by Dr. Francis Innes, C.B., Deputy-Inspector-General.

Average strength		4,059
Average daily sick		153
Total admissions into hospital		3,541
Total deaths in hospital :—		
From disease	39	
Suicide	1	41
Shot by Comrade	1	
Total deaths out of hospital		4
Invalided		102
Ratio per 1,000 of deaths from disease... ...		9·6
„ „ from all causes ...		11·08
„ „ of daily sick		37·69
„ „ of invaliding... ...		25·12

General Health of the Troops.—Though the health of the troops in these islands during the past year has been much better than the average of this station, it was far inferior to that they enjoyed during 1860, when the daily sick was only 33·6, and the death rate from all causes only 6·3 per 1,000.

This increase of sickness and mortality in 1861 was due to an epidemic typhoid fever which prevailed, during the autumn months, throughout the Command, though it only proved fatal at Corfu, where bad sewerage, overcrowding, and other defective sanitary arrangements were superadded to miasmatic influences.

It is sad to find, in spite of all that has been spoken and written regarding sanitary reforms, that in an important garrison like this 42 per cent. of the admissions and 63 per cent. of the deaths should still be due to diseases believed to be preventible ; and to this large waste of life by zymotic diseases there has to be added the still more deplorable results of crime and violence. Of the 45 deaths that occurred in the force in 1861, 5 are directly due thereto. One man was murdered and another executed, two committed suicide (one by cutting his throat and one by blowing his brains out), while a fifth died in a wine-shop immediately after swallowing a large quantity of raw spirits.

A poor fellow of the 2nd Battalion 2nd Regiment was drowned by stepping into the citadel ditch in the dark while on sentry. This leaves 39 deaths from disease, of whom 26 died at Corfu from typhoid fever. Though stray cases of this disease proved fatal throughout the year, it was not till July that the disease appeared as an epidemic, and this it did simultaneously throughout the Command ; and it seems to have prevailed throughout the Mediterranean generally, as some of Her Majesty's ships brought well marked cases of typhoid fever from Malta.

At Cephalonia, the admissions from fever during the months of July, August, and September, amounted to 255 ; being 47 per cent. of the strength. Neither there nor at the smaller islands did any of the cases prove fatal ; while, at Corfu, out of 987 admissions there were 26 deaths. The disease was not equally prevalent and fatal throughout the latter garrison. At Fort Neuf, the sanitary state of which has long been rendered abominable by its vicinity to the mouths of the town sewers, the ratios of admissions and deaths per 1,000 of strength were 323 and 12 ; while in the citadel, where no such gigantic nuisances exist, the ratios were only 176 and 8·8.

Barracks, &c.—The barracks throughout this Command were all carefully and minutely figured and described in a very elaborate and able "special

report" by my predecessor, Deputy-Inspector-General Dr. Beatson, so late as 1860, and since this date there has been no change either in the nature or amount of accommodation, or in the numbers to be accommodated; it is, therefore, unnecessary for me to do more than refer to this report, and to state generally that the citadel barracks are:—

1st. *Old Venetian Barracks, Corfu.*—The old Venetian (a building of unknown and very remote antiquity), consisting of four stories of double rooms, separated by a partition wall throughout the whole length, with two wings projecting at right angles. Ventilation here is greatly obstructed, not merely by the form and interior plan of the building, but also by its close proximity to the citadel rock along its whole length and southern aspect. The ventilating shafts alluded to in Dr. Beatson's report have been inserted, but in the opinion of the Sanitary Commissioners they are so placed as not to be of much use. In no part of the building can there be anything like through ventilation. The space per man it has afforded during the year has been from 450 to 480 cubic feet.

Long Rooms, Citadel.—Besides the barrack strictly Venetian, there are two long rooms allotted for 77 and 79 men. These are spacious, being 28 feet broad by 20 feet high. The back wall, however, of the lower storey (which is occupied by stores) is in contact with the rock, and that of the upper storey is only distant from it from 4 to 5 feet. The window-space in the building is small, and ventilation even in front is obstructed by other buildings.

Bomb-proof Barrack, Citadel.—The new bomb-proof (the best barrack in this garrison) was built in 1847, and consists of two storeys, occupied by the Royal Engineers and a Line Regiment; the basement used as stores. The rooms run across the building, and have two large windows at each end. They communicate by a passage separated from the room by an iron railing only. As the beds are now ranged along the dead walls, the ventilation cannot be very good; and the cubic space is, for the Engineers, 500 feet, while it is for the Line only 437 to 446 cubic feet per man.

Fort Neuf.—The Lower Fort Neuf Barrack is of four storeys (the basement being occupied as stores, canteen, &c.); it is built at the foot of the rock, which has been partially scarped to give room for the erection. It fronts to the north, looking out directly on the harbour, and is closed behind by the rock, which overtops the building. In the eastern half are the mess room, &c., with 14 officers' quarters; while the western half has 4 barrack-rooms on each floor, 12 in all, allotted to 30 men each. The length of the rooms is the breadth of the building, and they have two large windows looking to the harbour, and a door and two smaller windows looking on the scarped rock; the beds being all arranged along the dead walls. The allotment of the barrack gives only from 383 to 345 cubic feet; but by the use of huts, tents, &c., this has been increased during the year to from 402 to 463 cubic feet per man.

Bell Barrack, Fort Neuf.—The Bell Barrack is built on a rock 180 feet above the sea. It is bomb-proof, and has doors and windows only on the south side, where it is protected by defences. Where it looks on the sea there are only narrow loop-holes, rendering the rooms very dark. The space per man in them has often been as low as 317 cubic feet, and even lower.

Fort Abraham.—This fort has been occupied by an average strength of 146 men. They have been accommodated in a spacious airy room, huts, and tents.

Vido.—The Vido Barracks have accommodated an average strength of 374 men. They are all loop-holed, and covered closely by the defences; so the ventilation is necessarily very imperfect. The prison has been much crowded, three men being often confined in a cell intended for one; but both the garrison and the prison have been remarkably healthy, though from being occupied by detachments of different regiments, constantly changing, and much engaged in rifle practice, cleanliness in barracks was not so closely attended to as it ought to have been. The prison is a show-place for neatness and purity.

Accommodation for Soldiers' Families.—During the past year two brick huts, with verandahs, have been erected at Vido, each containing five airy, well-lighted and warmed quarters for married soldiers; to which has been added ablution-rooms for men and women, as well as a washing and ironing

room. This is a great boon, and it is most desirable that similar provision should be made for the married soldiers in Corfu, who are either crowded in the dark and dismal basements of the old Venetian Barrack, or in rotten Crimean huts, or in a hired house in a crowded part of the town. It has been submitted for the sanction of the home authorities, that the building now occupied as Principal Medical Officer's office, the medical stores, pharmacy, and by the apothecary to the forces, should be extended and converted into married soldiers' quarters. The site is very beautiful and salubrious, and most convenient as regards the barracks; and I cordially concur in the proposal, through the interest we take in the health, comfort, and respectability of the hitherto neglected families of the soldiers committed to our care.

Comparative Salubrity of the various Barracks in Corfu and Vido in regard to Admissions from Fever.—I have now described the various barracks in this garrison, and I think their comparative salubrity will be best ascertained by the relative liability of the inmates to fever—the only zymotic disease of any importance from which they have suffered. With this view I subjoin a return showing the number of admissions into hospital and deaths, from the various barracks, &c., in Corfu and Vido, between the 1st of January and the 31st of December, 1861.

RETURN showing the Number of Admissions into Hospital and Deaths from Fever, from the various Barracks, &c., in Corfu and Vido, between the 1st of January and the 31st of December, 1861.

Barracks, &c.	Venetian Barracks, Citadel, Corfu.			Bomb-proof Barracks, Citadel.			Lower Fort Neuf Barracks.			Upper Fort Neuf Barracks.			Tents, Fort Neuf.			Huts, Fort Neuf.			Fort Abraham.			Vido Barracks.			Tents and Huts, Vido.			Lazaretto.			Total Number of Fever Cases.		Average Monthly Strength of Men occupying Barracks, &c.
Corps ...	R. A. and 1st Batt. of 9th.			R. E. and 2nd Batt. of 2nd			2nd Batt. of 4th.			R. A. and 2nd of 4th.			2nd Batt. of 4th.			2nd Batt. of 4th.			2nd Queen's.			R.A., 2nd Batt. of 2nd, 2ndBatt. of 4th, and 1st Batt. of 9th.			2nd Batt. of 2nd, 2nd Batt. of 4th, and 1st Batt. of 9th.			1st Batt. of 9th.					
Average Strength ...	862			728			336			211			66			54			146			374			140			4					
	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.	Monthly Strength.	Fever Cases. Admitted.	Fever Cases. Died.			
January 1861	879	3	1	720	3	...	338	4	1	196	1	...	...	...	...	69	...	...	130	3	...	471	1	...	99	1	1	4	...	...	16	3	2,906
February ,,	861	2	1	726	6	...	336	3	1	195	2	...	...	...	...	67	1	...	133	1	...	456	...	...	122	...	...	4	...	...	15	2	2,906
March ,,	961	4	...	682	6	...	370	1	...	242	2	1	...	...	...	69	...	...	133	1	...	342	...	...	102	...	...	4	...	...	14	1	2,905
April ,,	885	7	1	745	7	...	369	...	...	238	...	...	...	...	...	64	...	...	146	3	...	353	...	...	100	...	...	4	...	...	17	1	2,904
May ,,	887	16	1	765	14	...	360	4	...	225	...	...	...	...	...	59	...	...	134	1	...	371	3	...	92	1	...	4	...	...	39	1	2,897
June ,,	891	16	1	739	16	...	333	5	1	218	3	...	54	...	...	43	3	...	150	3	...	366	...	...	119	3	...	4	...	...	49	2	2,917
July ,,	853	39	2	741	25	...	312	15	1	201	3	...	88	8	...	...	16	...	145	6	...	329	2	...	185	2	...	4	1	...	117	3	2,858
August ,,	864	21	...	752	30	3	316	53	...	193	17	...	102	30	...	...	2	...	140	19	...	315	6	1	185	2	...	4	..	1	180	5	2,871
September ,,	769	14	2	748	16	2	312	12	...	204	3	1	50	14	...	43	...	...	186	7	...	290	3	...	213	1	...	4	...	...	70	5	2,842
October ,,	747	13	...	662	9	...	321	3	...	205	2	...	36	1	2	21	2	...	169	2	...	450	2	...	191	...	1	4	...	...	34	3	2,806
November ,,	...	5	...	...	5	...	...	2	...	...	1	...	...	...	...	...	...	...	...	2	...	...	1	...	...	...	...	...	...	...	17	...	...
December ,,	...	...	...	...	5	...	...	1	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...	...	...	...	...	...	10	...	...
Total ...	862*	140	9	728*	142	5	336*	103	4	211*	34	2	66*	53	2	54*	26	...	146*	48	...	374*	20	1	140*	11	2	4*	1	1	578	26	2,880*
Ratio per 1,000 of strength...	...	162	10·4	...	195	6·8	...	306	11·9	...	161	9·4	...	803	30·3	...	481	...	...	328	...	...	53	2·6	...	78	14·2	...	...	...	200	9·02	...

* Average.

Admissions per 1,000 = 323
Deaths ,, ,, = 12

I should have included in this return the monthly average daily sick from fever from each barrack; but, as one corps sometimes occupies several barracks, and portions of two corps sometimes occupy the same barrack, while the sick are treated in their regimental hospitals, this cannot be done with accuracy. I therefore subjoin the information by regiments, which gives an approximation to the truth.

RETURN showing the Monthly Average Daily Sick in Hospital from Fever in the several Corps in Garrison at Corfu and Vido, from 1st January to 31st December, 1861.

Corps	Royal Artillery and Royal Engineers	2nd Battalion of 2nd Regiment.	2nd Battalion of 4th Regiment.	1st Battalion of 9th Regiment.	Total Strength occupying Barracks, &c.
Barracks, &c. ...	Old Venetian and Bomb-proof Barracks.	Bomb-proof Barracks and Fort Abraham.	Fort Neuf Barracks.	Old Venetian Barracks.	
Average Strength.	543	865	801	671	2,880
January 1861	1·5	3·7	3·0	0·5	8·7
February ,,	1·0	2·5	5·5	1·0	10·0
March ,,	0·7	2·5	4·0	1·0	8·2
April ,,	0·0	3·5	1·7	2·2	7·4
May ,,	1·5	6·0	3·5	3·5	14·5
June ,,	3·5	5·7	7·2	3·7	20·1
July ,,	1·5	10·0	13·2	13·2	37·9
August ,,	3·7	14·5	20·7	11·5	50·4
September ,,	4·7	7·5	13·0	5·5	30·7
October ,,	8·2	3·7	9·0	1·5	22·4
November ,,	6·6	1·6	5·2	2·2	15·6
December ,,	3·2	1·2	At Cephalonia.	0·0	8·5
Average of each Corps	3·0	5·2	7·9	3·8	19·9
Deaths in each Corps	3	4	9	10	26
Ratio per 1,000 Daily Sick ..	5·5	6·01	9·86	5·66	6·90
Ratio per 1,000 Deaths.. ..	5·5	4·62	11·2	14·9	9·33

The large percentage of admissions from Fort Abraham is to be explained by the men there being subjected to insolation from their employment on the public works. Most of the cases were slight, and none proved fatal.

Barracks, Southern Islands.—Barracks in the Southern Islands have been less crowded than those at Corfu, and have been much healthier. Those at Cephalonia have been improved by the introduction of wooden ventilators in the roof, and by the removal of partitions in the hired houses, and opening and enlarging windows of prison-room. The Cerigo Barracks have been repaired.

The barrack-rooms throughout the Command have no fireplaces, though in all good houses of the inhabitants fires are used during at least three winter months.

Ablution Accommodation, Corfu.—The ablutionary accommodation in the Bomb-proof Barracks has been improved by the introduction of gratings, hip and foot tubs, with screens, behind which men can perform complete ablution with decency. The floor of the bathroom is always in a very sloppy state, as the dirty water passes off by an opening into the centre of the floor, towards which there is not sufficient fall. A separate ablution-room is much required for the Engineers in the Bomb-proof Barrack.

The ablutionary accommodation in Fort Neuf has also been extended by giving up a washhouse for this purpose.

The ablution-room of the Venetian Barracks, in the basement of one of the long rooms, is only separated by a wooden floor from the barrack-room above. This is very objectionable.

In every station in the Command sea-bathing is practised. During the summer months there are three bathing-parades a week, and independent bathing can be enjoyed at appropriate hours every day.

Cooking.—The cooking arrangements are complete at all stations save Fort Abraham, which is at present in a transition state, and at Vido, where there are no ovens for the men; but the ovens are constantly getting out of repair, as the bricks obtainable here are quite unsuitable for this purpose. At the smaller stations, the men's dinners can be baked cheaper by private contract than in the barrack oven, as it does not pay to heat an oven to bake one meal.

Latrines, Ash-pits, &c.—The latrines in Corfu Garrison are all most imperfectly constructed. They are flushed by hand, and from the limitation of space they are all too near the barrack-rooms. Macfarlane's flushing apparatus has been promised for all of them, but has not yet been received.

Ash-pits have been already done away at Fort Neuf and Vido, and arrangements have been made (to take effect from the 1st of April), by which all refuse from the hospital and barracks in the garrison will be at once deposited in carts to be removed daily. This will, I think, be a very great improvement on the present arrangements.

The interior of Fort Neuf is at present beautifully clean, but the stenches that arise from the mouths of the town sewers opening into the harbour in its immediate vicinity are most abominable, and are a fertile source of sickness and mortality there, as I have already demonstrated in the foregoing Table. The authorities here are powerless to remedy this. The subject was brought most strongly to the notice of the Sanitary Commissioners who visited the place in October last, and our hopes of a remedy for the terrible and lethal nuisance rest on them alone.*

Water Supply.—Is good and sufficient throughout the Command.

Men's Diet, &c.—There has been no change in the composition of the ration. The supply of groceries by the Commissariat has worked well for the men, and generally the supply of vegetables at Corfu is sufficient. Potatoes, which the men prefer to any other vegetables, can generally be had in the market, as they are now becoming extensively cultivated in this island. In the smaller islands there is difficulty at times on this point. An improvement has lately been effected in the bread, by having it baked with yeast instead of dough. Taking into consideration the duties of the troops, I believe the ration has been sufficiently varied and nutritious for health.

Canteen Supplies.—Country wines are chiefly used by the men, and they are generally speaking wholesome. Good English beer and porter have lately been introduced into the canteens, but they are too expensive to be much used by the private soldier.

To intemperance is attributed much of the development of the phthisis which occurs in these islands; otherwise it is not the cause of much disease.

Clothing.—The permission granted last hot weather for the men on duty to wear a linen smock, instead of the heavy cloth tunic, was a great boon; and were the forage cap, with quilted cover and curtain, substituted for the shako, and night-sentries allowed to wear during very hot weather the great coat over the shirt, the boon would be complete. The smock might then be left in the guard-room when the sentry proceeded to his post, and be resumed ont his return. It would then be dry and comfortable, instead of being saurated with perspiration as at present. This was practised occasionally, but not generally, last year; and I believe in some instances men were found fault with for doing so. I do not propose that this arrangement should be compulsory on every one.

* A consideration of this enduring and aggravating evil was still more lately urged by letter to the Quartermaster-General of the Army from Dr. Gibson, C.B., Director-General of the Medical Department, dated 16th August, 1862.

Foot-soreness.—There has not been marching enough to ascertain the liability of the men to foot-soreness.

Duties, &c.—Duty and exercise have not in any case been a cause of disease, save in very exceptional circumstances, as from temporary pressure during rifle practice. The men throughout the Command have had at least four, and generally five or more, nights in bed. Here, as elsewhere, I have observed that the best drilled regiment was the most healthy and most orderly one. The hours of drill are so arranged as not to involve undue exposure to sun; but the hours for working-parties (7 to 12 o'clock in the morning, and 2 to 7 o'clock in the evening) involve an amount of exposure which in very hot weather might be dangerous. Last year these parties gave a large proportion of admissions from fever, but the cases were neither severe nor intractable. When in 1859 my predecessor, Deputy-Inspector-General Dr. Beatson, proposed a curtailment of those hours during an intensely hot season, the engineer and military authorities preferred suspending the works.

Exercises, &c.—Cricket and foot-running are practised. There is in the citadel an admirable gymnasium, much used; and a racket-court, which is not much frequented. There are two reading-rooms, well lighted, and supplied with books, papers, and periodicals, as well as instruments for innocent games. In Fort Neuf there is also a racket-court and a very comfortable and well-furnished reading-hut. At Cephalonia there is only a skittle-alley, but the men play football much. At Zante there are reading-rooms well furnished, and a skittle and ball-alley. At Santa Maura there are ball-alley and skittles, and ground for cricket; but too far from the fort (one mile and a quarter) to be much used. At Ithaca there is a good skittle-alley: and ground was given for a soldiers' garden, with water at hand, but it is neglected. At Cerigo and Paxo no provision has been made for the amusement of the men.

Canteens.—These are not very attractive, but are sufficiently commodious; and the comestibles, as well as the liquors, sold there are kept up to the mark by constant supervision.

Crime and Punishment.—The lock-up room at Zante Castle is too small and is ill-ventilated. That at Santa Maura is very ill-ventilated; and when prisoners have to be confined for more than a night they are transferred to one of the cells, which are all very good. The cells at Ithaca were found unhealthy, owing to bad drainage; but this was immediately rectified. At Cephalonia the sanitary condition of the lock-up room has been rendered satisfactory, and six new and good cells have been built during the past year.

The military prison at Vido has been far more crowded during last year than during any similar period since its erection; the commitments being 338, and the annual average strength of prisoners 51; against an average of 226 and 34 for twelve preceding years. Owing to this the prison has been much crowded, three and four men having often to be confined in a cell intended and only suited for one.

The solitary cells are badly ventilated, owing to the shutter intended to obstruct the view being placed so close to the window as to obstruct the air also. This was brought to the notice of the Sanitary Commissioners, who appeared to concur in my opinion.

Owing, I presume, to the intense cleanliness of the prison and the purity of the surrounding atmosphere, the prisoners have been very healthy. There has not yet been time to test the effect on health of the improved scale of diet.

Vaccination.—Vaccination has been constantly kept up. The whole force is thoroughly protected, and there has occurred no case of small-pox during the year.

Prevailing Diseases amongst the Troops.—(*Zymotic Diseases.*)—Twenty-six deaths, being 74 per cent. of the mortality from disease in Corfu garrison, have occurred from typhoid fever—a disease depending more perhaps than any other on imperfect sanitation.

The more important sanitary defects on which the mortality in this garrison has depended are:—

1st. The barracks are placed at the foot of precipitous rocks, and are built rather for defence than ventilation.

2nd. Were they perfectly ventilated they contain space adequate for the health of 2,000 men, while they are occupied by 2,960.

3rd. Though the cleanliness of the interior of the forts and barracks is controllable by the military authorities, that of the town of Corfu, which to a considerable extent environs them, is solely under the charge of the Ionian municipal authorities, who do not, I presume, quite identify themselves with the interests of the soldiers.

To remedy this state of affairs, I beg to recommend that the sanitary condition of all buildings, the property of the English Government and occupied by English troops, should be at once perfected; and the measures necessary for the purpose will ere now have been indicated by the Sanitary Commissioners with a fullness of experience and authority to which I can add nothing.

Hospitals.

General Hospital, Corfu.—The only accommodation for the sick of the garrisons of Corfu and Vido (2,960 strong), is in the General Hospital, a two-storeyed building, containing eight wards in each storey. These communicate by a corridor, eight feet wide, running along the whole length of the back of the building. Each ward measures $44 \times 18\frac{1}{2} \times 12$ feet $= 9{,}756$ feet, and has two large windows opening northwards to the sea, and a door and two windows opening into the corridor. The Secretary of State for War directed that the allotment for each ward should be seven patients and one orderly; but, as this involved the erection of extensive additions which have never yet been provided for, there have always been ten beds in each ward, giving beds for 144 patients and 16 orderlies, at 975 cubic and 81 superficial feet each. The garrison has generally been so healthy that this number of beds has been sufficient: but during last hot weather, when typhoid fever prevailed extensively, it was necessary to put twelve beds in some wards, and these were often all occupied by sick; so the orderlies had to sleep in the corridors. The danger of this state of affairs was so great, that I had tents pitched in the vicinity of the hospital; but the heat and glare from the rock were so great that they could only be occupied by slight surgical cases, and that with great discomfort. Fortunately the epidemic declined, and the tents were dispensed with.

It must be very obvious that these wards are not suited to contain more than eight beds, to each of which they would give less than 1,220 cubic and 102 superficial feet; and at this rate there would only be ward-space for 112 sick—3·6 per cent. of the garrison. The calculation of ward-space given in former reports from this office included the corridors, and it is true the communicating doors and windows are generally open; but, as they are hermetically sealed at both ends, and open only into a narrow close yard, they cannot be properly styled "fresh-air chambers."

Various means have been proposed by my predecessors, as well as by myself, for improving and extending the hospital accommodation of this garrison, and plans were sent out from home last year for a hut hospital, to contain fifty beds, to be erected at Vido. For this purpose an excellent site was selected, but nothing further has been done.

On the 22nd May last, I (in consultation with the General-Commanding and Royal Engineer) submitted proposals for extending and improving the accommodation afforded by the General Hospital, which were intended to be included in the estimates for the ensuing year. These proposals appeared all to meet with the approval of the Sanitary Commissioners who visited these islands in October last, and have, ere this, doubtless, reported on all the military buildings in the Command. As they can take a larger and more practical view of sanitary requirements than we can venture to do, I shall content myself with the expression of a fervent wish that the more urgent of their recommendations may be speedily carried into effect. The warming and ventilation of the hospital are both very defective.

Latrines.—The General Hospital latrine, from its imperfect construction,*

* A Macfarlane's flushing apparatus was strongly recommended to be supplied so long previously as in April 1861.

is a constant source of intense nuisance. It must be converted into a "water latrine" before it can be tolerable. The water-closets in the ends of the corridors are so badly constructed that they are all locked up.

Water Supply.—In the early part of the year the water supply was often bad, owing to the tank not having been cleaned since the hospital was built. This has now been done, and the water is pure and good. There is only water laid on in the kitchen and dead-house. There ought, at all events, to be taps near the ends of each corridor as well as in the ablution-room.

Ablutionary Accommodation.—The ablutionary accommodation in the General Hospital is not sufficient. The room is large enough, but there are neither ledges, gratings, nor pegs. All the water is obtained from a pump in the centre of the room. There are only slipper and shower baths. The waste water runs off by a sink in the middle of the stone floor. The communication before referred to includes proposals for remedying all these deficiencies.

Kitchen.—The hospital kitchen contains sufficient means for proper cooking, but the oven should be built with proper fire-bricks, as it is constantly getting out of order.

Lime-washing.—The wards have been regularly lime-washed, and no zymotic disease has broken out or spread in the hospital.

Southern Islands.—The hospitals of the Southern Islands are all better, considering their probable number of inmates, than that at Corfu. A new house has been obtained (hired) for the hospital at Ithaca.

General Observations.

Soldiers' Institute in the Town of Corfu.—In addition to the various means supplied by the State for the intellectual improvement of the soldier, there has been established in town, by private subscription, a Soldiers' Institute, where there is a good and well-furnished reading-room. Coffee, ginger-beer, and other non-intoxicating drinks, cigars, slates, writing materials, &c., are supplied at very low prices. Lectures are delivered every Saturday evening, generally by officers of the garrison, which draw large and attentive audiences. The institution is at present well supported and frequented.

Concluding Remarks.

Hospital Accommodation for Sick Women and Children.—The necessity of some hospital accommodation for sick women and children is most urgent, and the Major-General Commanding has occasionally given permission to admit into the General Hospital severe cases of sickness in the class. These poor creatures have been treated in all sorts of out-of-the-way corners; anything being better than the discomfort and degradation to which they would be subjected in a barrack-room occupied by several families. It must, however, be borne in mind that there is only one hospital in Corfu, and that it only affords the regulation space for about 3½ per cent. of the garrison. It is, therefore, only in the absence of all epidemic sickness that any but fighting men can be received into it.

THE NOVA SCOTIA COMMAND.

With reference to the subject of permanent barracks and hospital accommodation, Deputy-Inspector-General Mr. McIlree gives account in tabular form and similar to the synoptical Table published with his special Topographical Report in the Department Volume for the preceding year. This tabular view has afforded a ready means of information as to the conditions of the barrack and hospital occupation for the year, and prior to the pressure created by the influx of the Expeditionary Army despatched from England, arriving in main bodies at Halifax at and after the close of the year.

Looking to the conditional future, the accommodation would have been altogether insufficient for the wants of the contemplated force (some 5,000 men), which was intended to constitute the establishment for this Command, and the local military authorities, in consequence, prepared plans for the

erection of new wooden buildings in both provinces—Nova Scotia and New Brunswick—to meet the anticipated exigencies; but the reduction in the strength of the above-proposed force, subsequently, so far took place that it appears the Government gave up intention of constructing the new buildings, for the present at least, and as the prospective occupation of several outposts might still lessen the demand during the next winter.

Looking to the once-contemplated augmentation of permanent force for Nova Scotia and New Brunswick, and the present extent of permanent barrack and hospital accommodation, the Deputy Inspector-General shows, as follows, the increase which would have been necessary to meet the requirements of the Command.

	Contemplated Force in 1862.	Permanent Barrack Accommodation in 1861.	Permanent Hospital Accommodation in 1861.	Additional Barrack Accommodation for 1862.	Additional Hospital Accommodation for 1862, at 6 per cent.	Remarks.
Nova Scotia	2,600	1,800	70	800	*100	* Not including Hospital Sergeants, Servants, &c.
New Brunswick ..	2,400	800	40	1,600	*100	
	Force and Accommodation at date of forwarding this Return—September, 1862.					
Nova Scotia	2,457	*1,800	70	657	90	* Not including Out-post Stations.
New Brunswick ..	1,018	*800	40	218	20	

The hospital accommodation has been estimated at 6 per cent., leaving a considerable margin for any probable emergency beyond the ordinary proportion of sick to strength in the Command; but, in the event of war at any time, Mr. McIlree expresses his opinion that Halifax and St. John's (New Brunswick) must be the sites for general hospitals, to demand special estimates on the occasion.

The troop ships of the late Expeditionary force, with very few exceptions, touched at Halifax after their Transatlantic course, leaving there two of the young 2nd battalions and 600 men of the Royal Artillery. The army thence passed on to St. John's, New Brunswick, and advancing to Canada, in mid-winter, traversed an overland route—an expedition destined to be famous in military annals for its complete and most successful result, not only in the rapidity of its accomplishment over snow and through rigours of climate, but in a sanitary preservation of the troops surpassing every anticipation.

In the general combination of the departments administering for the safety and welfare of the troops, under circumstances of service so novel, no small share of praise was due to the efforts of the very effective body of Medical Officers, Staff and Regimental, administrative and executive, charged with the sanitary arrangements and duties to be fulfilled amidst the thronging disembarkations at Halifax, and along the frozen course of the overland route, to the destinations in Canada.

To the Expeditionary Army a special sanitary officer, Deputy Inspector-General Dr. Rutherford, was appointed, and to be attached to the Quartermaster-General's Department. The following memorandum of instructions, approved by the Minister of War, was issued to Dr. Rutherford:—

Memorandum for the Sanitary Officer of the Army in Canada.

1. You will be attached to the department of the Quartermaster-General, and will accompany him, or such officer under him, as he may appoint, on each occasion of selecting buildings for occupation by troops, whether as hospitals or quarters, temporary, or for more permanent purposes. You will carefully examine into their sanitary condition, as respects cleanliness, within and around them, the state of their drainage, sufficiency of ventilation, facility and

quality of water supply, and all other such points likely to affect the health of the troops, or the welfare of the sick: and you will advise the Quartermaster-General, or his deputy, on all sanitary subjects, indicating every hygienic defect, or matter requiring remedy.

2. According as troops may be moved from point to point of the country for the occupation of towns or posts, you will make a careful survey of these, and submit recommendations for maintaining an effective sanitary supervision to preserve every cleanliness, and for arrangements to secure the prevention or earliest removal of all nuisances, as well as for the execution of whatever measures you may consider requisite to protect the health of the troops in occupation.

3. On a selection of any site for an encampment of huts or tents (according to the season) becoming necessary for portions of the army, you will proceed with the Quartermaster-General, or his deputy, for the purpose of submitting your opinion upon the question of salubrity, or otherwise, of the proposed position, and, when the locality shall have been decided upon, you will make such recommendations as you may deem necessary respecting the preparation of the ground, the distance of huts or tents from each other, the number of men to be allotted to each respectively, whether as quarters or hospitals, (subject to the conditions of the climate and seasons), the state of ventilation and warming of huts, more especially as to the latter purpose; also for devising the best expedients for defending the men from the effects of ground dampness, particularly during the breaking-up of the winter and the season of thaws. You will recommend such a system of sanitary police as will tend to the maintenance of general cleanliness throughout such camp, the best means for securing and maintaining in a state of purity the water supplies for the troops, the most advisable position for latrines, &c., the systematic use of earth or charcoal dust for these places, the early removal from the camp and its precincts of all collections of refuse, and the disposal of this by burning, together with all conservancy measures which the nature of the locality may facilitate. You will bestow great attention on the state of the drainage within the camp, as also in the vicinity around it.

4. You will keep yourself constantly informed of the sanitary condition of every camp, barracks, or building temporarily occupied as such, and hospital, in regard to general cleanliness, means of ventilation and warming, &c.; also as to their state of drainage and sewerage, pointing out all defects under these heads, with a view to suitable remedies being applied at the earliest.

5. During the period you may have to remain on sanitary duties at any station of the Command or post hereafter to be occupied, you will indicate all hygienic measures to be carried out and systematically maintained in military buildings, barracks, and huts or hospitals—giving your earliest attention to the appearance of any zymotic or other disease likely to become prevalent among the troops, examine into the cause of the same, whether such disease proceeds from, or is aggravated by, sanitary defects in cleansing, bad drainage, local nuisances, over-crowding, defective ventilation, or insufficient warming, impure or deficient water supply, dampness of site, defective quantity or quality of the men's rations, the use of unwholesome and deleterious liquors, or other supplies of unsound kind, insufficient clothing, or unsuitable for the season, over-fatigues and exposure of the troops to the vicissitudes of the widely-varying seasons of the Canadian climate, upon all specialties of which kind you will immediately submit a report to the proper authorities, viz., the Officer Commanding and the Principal Medical Officer, setting forth also on the occasion the remedial measures you would propose in each instance; you will see that the same are satisfactorily carried out, and, where necessary, report daily upon the results, for the information of the Officer in Command, sending copies of such reports to the Principal Medical Officer.

6. Whenever troops in main body have to proceed by line of march, you will accompany the Quarter-Master-General, or the officer acting for him, and collect as much information as possible in regard to the medical topography of the districts to be passed through, with special reference to localities which ought to be selected or avoided as temporary halting or more permanent camping grounds.

7. Should troops in divisions, brigades, or other considerable strength, be

called upon to proceed through any portion of the country at unhealthy or inclement seasons, you will accompany them, and submit the best-devised means and arrangements for preventing attacks of disease or mitigating it.

With respect thereto, it will become most requisite that the men should have refreshment of warm coffee, more particularly before marching, and that their meals of the day should be so appointed, if possible, as to avoid fasting too long between them in a climate of severe winter asperities, should the service compel their exposure to such. If troops are to be conveyed on sledges, or by any other means of transport, you will give such advice as may appear to you to be necessary to prevent the men suffering from the effects of climate, exposure, &c.

8. It will be for you regularly and systematically to enquire into and examine the nature of the supplies and provisions for the troops you may be accompanying, also as to the composition of the soldiers' ration, whether it is sufficiently varied in its constituents, and of adequate amount. You will also satisfy yourself as to the efficiency of the means and appliances for cooking, and whether the meals are well and properly prepared. As troops exposed to a very low temperature require a larger proportion of animal food to keep them in health and vigour than the present established ration contains, the Secretary of State for War has, in consequence, been pleased to instruct the General Officer commanding to increase the meat portion of the soldiers' ration to 1¼ lb. or 1½ lb., if necessary. Should troops be obliged to take the field during the winter season, you will recommend such increase of the meat ration up to 1½ lb. per diem, as you may consider necessary for their health.

9. Under the circumstances of service and exposure the troops may have to encounter, scurvy may occur among them ; care should therefore be taken that the ration contains a sufficient amount of fresh vegetables, and that lime-juice be issued to the men three or four times a-week, or oftener if necessary.

10. Under the trying conditions of the climate it will become an anxious and important duty for you to regard the clothing of the army, and so as to recommend that it be worn and modified according to the exigencies of the season and state of the weather, especially considering the night duties of troops at all times. It has been intimated that each soldier embarking for Canada will be provided with the following :—

1 fur cap, 1 pair fur gloves, 1 pair knee boots, 2 woollen Jerseys, 2 pairs woollen stockings, 1 comforter, 2 pairs woollen drawers, 1 chamois jacket.

Should you consider any additional clothing requisite, either for day or night, you will represent the same to the General Officer commanding.

11. Upon joining the Command it should be a first duty, the immediate military arrangements admitting, and with the concurrence of the Principal Medical Officer, for you to make a minute and systematic sanitary inspection of every barrack and hospital at the respective stations, and, as the course of communication at the season may enable you to do, using all means of promptitude and dispatch in order to submit your recommendations to the authorities in regard to the arrangements which may be necessary to meet the accommodation of what may become a largely increased number of troops in Canada.

As much of the barrack accommodation is likely to be imperfect, you will make such recommendations as may appear necessary, in ventilation and warming, in improved drainage of the barracks and hospitals, in reconstruction of latrines and urinals, facilities for cooking, commodious ablution and bath conveniences, wash-houses, &c., all of which conditions it will be advisable that you should report upon to the local military authorities, suggesting such arrangements and accessories as you may conceive would aid to meet the necessities of troops in the event of their being collected in excess of numbers at any of the stations. As the expediency of resorting to hired buildings for their accommodation may become indispensable under the above circumstance of limited barrack accommodation, a previous thorough inspection of any such must be made by you, and its eligibility, or otherwise, in all sanitary respects, be reported to the authorities.

12. With the sanction of the General Officer in command, and that of the Principal Medical Officer of the force, you will, on commencing your duties as Sanitary Officer of the army, as well as on all subsequent occasions which may prove of necessity, issue such instructions regarding precautions and measures

for protecting the health of the men as you may deem requisite for the guidance of medical officers in their respective charges.

13. You will obtain weekly sanitary reports from all medical officers in charge of troops, drawing up from them a general report upon the hygienic condition of the army, keeping the militia and regular portions of the Force distinct, for the information of the Commander of the Force, and that of the Principal Medical Officer; and you will transmit through the latter a fortnightly (or weekly if possible) report to the Director-General, embracing all the specialties of sanitary occurrences and transactions which have taken place during the period.

14. It is to be understood that the Principal Medical Officer of the Force is to be kept intimately informed of all recommendations and reports which you may have deemed it necessary to make at any time to the Commanding or other Officers.

15. All medical officers, on having occasion to make complaints of a sanitary nature, should, in the first instance, submit them to their own immediate Commanding Officers.

16. Local circumstances must arise from time to time which, doubtless, will present many conditions beyond the scope of these general instructions, and to all such it will be your special duty to devote your best judgment and vigilant care.

Army Medical Department, 13th of December, 1861.

With further regard to the course of the Expedition, a Deputy Inspector-General of Hospitals (Dr. Fraser, C.B.) was stationed at St. John's, New Brunswick, charged with the sanitary arrangements for forwarding the troops onward by sledges from Fredericton over the route thence to Riviere du Loup, from which point railway communication was to convey them towards Quebec.

The Deputy Inspector was instructed by the Director-General, in a letter of 19th December, to superintend the disembarkation of the regiments or corps at St. John's, and to afford the officers commanding all due suggestions, and the medical officers in charge the necessary instructions, in regard to the measures to be taken and maintained towards protecting the men during their transit by the sledges and railway carriages. To aid him in the discharge of this superintending duty, his attention was requested to the following Memorandum of special instructions given by the Director-General, Dr. Gibson, C.B.:—

1. Each man should be supplied with two buffalo robes, one to be wrapped round the legs, the other arranged in the form of a great coat for the body, with a hood to cover the head, similar to those used by sentries in Canada; also with blankets, if considered necessary, and should the requisite number of buffalo robes not be obtainable.

2. Each man should wear two pairs of woollen stockings, and have mocassins provided for him on the occasion, if practicable; one pair of the stockings to be worn over the mocassins.

3. The troops proceeding, in succession, should have an ample warm meal of meat, with hot coffee, before starting; a bread and cheese refreshment, also, with hot coffee, at noon of the day's journey; and another hot meal on their arriving at the halting-place for the night.

4. A medical officer, if available, should be sent by you in charge of each party of troops, and you will take especial care that he is provided with an adequate supply of all necessary medicines, and a sufficient stock of medical comforts, as brandy, &c., to be immediately ready for use.

You will select a Senior Medical Officer to proceed with the first party of troops, and hand to him the enclosed instructions on the occasion.

5. You will make immediate arrangements at St. John's for sufficient hospital accommodation for men of the several regiments who may be found unable, on disembarkation, to proceed with their corps towards Canada.

6. You will station a Senior Staff Medical Officer at Fredericton, as also at Riviere du Loup, to provide for the accommodation and care of such sick men as it may become necessary to leave behind at either of these posts, and

you will give the medical officer at Riviere du Loup the requisite instructions as to housing and sheltering the sick, no hospital accommodation existing at that place.

To the Medical Officer selected to accompany the first party of troops despatched on the overland route, the following note of special instructions from the Director-General was addressed through Dr. Fraser :—

"You will accompany the first party of troops that may be moved from St. John's, New Brunswick, by Fredericton to Riviere du Loup, ascertaining that on their taking the sledges at Frederickton the soldiers are sufficiently protected from injury, through cold, by buffalo robes and blankets, &c.

"You will also take care that the men shall have an ample warm meal of meat, with coffee, before starting, a bread and cheese refreshment, also with hot coffee, at noon on each day's journey, and another hot meal on their arriving at the halting-place for the night. You will report to the General, or other officer commanding, and to the Principal Medical Officer at St. John's, any deficiency of rations which you may have been unable to get remedied at the time, acquainting them also with any defective water supplies, insufficient means of warming the huts, or other accommodation for the troops at the several halting-places of the route, the sufficiency or otherwise of their clothing, coverings, &c., on the sledges, and making all such special sanitary representations as may be for the benefit of the parties to follow.

"You will leave at Fredericton any soldiers who may be suffering from sickness, and are therefrom unfit to travel on the sledges, as also at Riviere du Loup any others who may require immediate accommodation and treatment.

"You will report to the Principal Medical Officer at St. John's, and without delay, all the leading occurrences of the journey, and give him every information that may be desirable for the guidance of the medical officers who may accompany the subsequent parties of troops over this route, with a view to the best protection and comfort being afforded to the men under their charge. You are further to communicate with the Inspector-General in Canada on the subject, and, as soon as you have made all necessary arrangements at Riviere du Loup, to proceed to his head-quarters and report yourself personally to him, unless, in the mean time, you shall have received other orders from that officer, or from the General Commanding.

"Dated—*Army Medical Department, 19th December,* 1861."

CANADA.

The general health of the troops in this Command appears to have been uncommonly good.

The Deputy Inspector-General, Dr. G. Taylor, enters, in his report, very particularly into the conditions of barracks and hospitals throughout the Province, for, at the end of the year, the available accommodation was a subject of paramount consideration, upon the pouring in of troops from England; whilst several barracks were of necessity to be re-occupied which had been held vacant for many years, and were, consequently, out of repair, and certainly in no point up to the sanitary requirements of the day, particularly in regard to means of ventilation, cooking, and ablution. A very unusual press of work hereby fell on the Royal Engineers' Department, by whom much was done to meet the requirements of the service, leaving, however, much still to be effected.

Quebec.—Adverting to this station of troops, and its admirable situation for facility of drainage, Dr. Taylor states that full advantage of the circumstance had lately been taken by the Town Corporation; the city being also abundantly supplied with excellent water by pipes from the St. Charles River, a tributary of the St. Lawrence.

The "Palace Gate" Barracks, occupied by the head-quarters of a brigade of Royal Artillery, were still in need of many sanitary improvements; among which were that water should be laid on from the Corporation pipes, and gas introduced, the means of doing so being almost at the very gate itself, alone

impeded, it is stated, by deferred questions of Annual Estimates. There were also much required a women's wash-house and drying-room, and bath accommodation for the troops. While the stables were ventilated by roof-shafts, the barracks had only doors and windows for the purpose; fortunately, in this climate, a considerably modified evil.

The "Jesuit" Barracks at Quebec, in which a battalion of infantry was quartered, are reported to be ventilated by shafts on all the three floors, and are supplied with water from the Corporation pipes. Six baths are attached to these barracks, and ample ablution accommodation is afforded, all supplied with hot and cold water. Were gas laid on to them, the barracks would, in all main respects, be very complete.

In regard to their hospital, after persevering representations, pipe-water became eventually introduced, and was found, of course, to be a great boon, baths and ablution-rooms being now available for use on every floor. During the year, roof ventilation, which was formerly supplied only to the third floor, had also been extended to the second. Dr. Taylor pronounces the accommodation to be in every respect good and ample; and, if lighted with gas, and furnished with some central water-closet, on account of the distance of the latrine from the top floor, he thinks it would be in all requisites an excellent hospital.

It has been occupied as follows: on the basement are placed the kitchens and storeage; on the first floor is ranged the general Medical Depôt of the Command; the second floor is assigned to the Regimental Hospital of the Infantry battalion, and the upper to that of the Artillery of the garrison.

The "Citadel" Barracks (Quebec) were occupied to the end of the year by one of the three battalions which landed from England early in July by the "Great Eastern."

In these barracks several important sanitary defects appear to have been remedied, particularly the closing up of a latrine in the basement of the redoubt, the upper floor of which was occupied by married soldiers and their families; the sewers also, from the latrines opposite the canteen, were rendered sufficiently large, and placed in satisfactory order, from having been previously an especial nuisance. Great defects, however, still exist in the ventilation of the casemated rooms and kitchens, particularly experienced in the former, when, in the winter nights, every crevice is said to be closed, causing a state of existence for the occupants which, under other conditions of climate, would be deadly. A gloomy picture is drawn of these apartments as being feebly lighted by a "tallow" in winter, their very cheerlessness driving men to grog shops, and the too frequent ruin of their health, an evil which is under the constant protest of medical officers; and who equally declaim against the whole system of barrack economy in this climate, wherein the soldier's winter life has, as yet, been ministered to very little in the way of real comfort, and the means, adequately, of attractive in-door entertainment in club or coffee-room, institute, or suitable barrack library.

Montreal.—To prepare for the accommodation of another of the three regiments which arrived by the "Great Eastern" steamship from England, in July, the barracks at Montreal were vacated for a time, to undergo a process of thorough cleansing. During this period, some six weeks or two months, the head-quarters were encamped on an eligible site, and four companies placed, also under canvas, on St. Helen's, an island in the river. The Principal Medical Officer observes that both these divisions suffered a good deal from diarrhœa, an affection which, he states, troops are not unusually visited with on their arrival in Canada; but in this instance it was of a mild character. The regiment was well found in camp equipment, rations, water, cooking means, &c., and the prevalent bowel complaint was more particularly attributed to the use of a bad, vapid description of beer, during the hottest period of the summer, when, under most favourable circumstances, such-like affections are not uncommon. The regiment afterwards took possession of the "Quebec Gate" Barracks.

The barracks here are reported to be old, unsatisfactory, in many respects defective, and difficult to keep in good order. Although the rooms were not overcrowded beyond the barrack appropriation (the old), yet no doubt was entertained of their being so as regards the sanitary requirements of the occupants. The means of ventilation, however, are reported as very tolerable.

The cook-houses of this barrack are supplied with boilers and ovens, which latter can bake meat for two companies daily.

The latrines are reported to be very unsatisfactory, the patent iron ones being found perfectly inoperative in winter; and a cess-pit, in rear of the south wing, built last summer as a "winter privy," and only about ten yards from the cook-house, is well pronounced a great nuisance. The only good thing, in a sanitary respect, possessed by these barracks, is said to be an abundant supply of good water from the Corporation pipes; and the greater is Dr. Taylor's regret that all the latrines within the barrack precincts, with so favourable an inclination, are not flushed into the river, which is only about thirty yards distant.

The hospital to the "Quebec Gate" Barracks is at some distance from them but well and pleasantly situated on the bank of the river. The wards are represented to be small, and, although built for 48 sick, would only be adequate to the occupation of one-half that number according to the new Hospital Regulations.

The barracks on St. Helen's Island are subsidiary, and occupied by a detachment of the regiment at Montreal. They are shown to be very defective in their sanitary adjuncts, having no ablution room, and, on account of the kitchen being on the basement, the fumes from it ascend to the rooms. The attics Dr. Taylor states to be "scarcely fit for human occupation." Yet, in spite of all such defects, a good average state of health prevailed among the men—bespeaking fortunate climatic influences.

Toronto.—To this upper station the third regiment, of those which arrived from England in July, was forwarded.

Of the regimental report of this station, by Surgeon Read of the 30th Foot, the Principal Medical Officer instances the interest in its reference to the medical topography of the vicinity. Dr. Taylor observes as follows:—

"Mr Read remarks on the great immunity from disease of an intermittent type at the present time, when compared with former years, and attributes the change more to cultivation of the land than to the influence of such occult causes as act in a cycle of years; and in support of his view he adduces an apposite illustration to the following purport. On the east side of the city (Toronto), where agues are quite endemic, the River Don, slowly winding through a large expanse of marshy ground, debouches into the upper end of the roadstead which, until three years ago, was completely shut off from the lake on the east and south by a peninsula, which rendered the waters in the vicinity of the Don all but stagnant. Within the last two or three years this peninsula near the mouth of the river has been converted into an island by the action of the waters of the lake, and, with the peninsula, the prevalence of ague in that locality has ceased.

"Although the site of the city is comparatively flat, and drainage difficult and defective, the troops are now found to be much less liable to ague than they were twenty years ago, when almost every disease, it is stated, partook more or less of a periodic character. In connection with the foregoing remark as to the decrease of ague, it is to be added that the large common around the barracks is now much improved and brought partly under cultivation; also that the site of the barracks is beyond the influence of the marshy district in the vicinity of the Don, and that the immunity of the troops from ague took place before the waters of the lake made so successful a 'sanitary effort' in that quarter."

The regiment at this station, Toronto, occupied the New Stone Barracks, the Old Fort, and a house in the town, formerly a printing office, but now called "King-street Barracks." The accommodation in these respective barracks, as also in the hospital attached to them, is stated to be good, speaking generally, although it does not approximate as could be desired, in cubic allotment, to the standard of the new regulations for temperate climates. Although much appears to have been effected in sanitary improvements, yet more is required to improve the means for varied cooking, and also the meat portion of the soldiers' dietary. The means of ablution in the barracks are represented to be very defective. The warming of the men's rooms is generally satisfactory; but here, again, the miserable lighting of them by tallow dips is the subject of complaint, so much so that the Principal Medical Officer does not refrain from expressing his opinion that the consequent cheerlessness must be looked on as a not unreasonable excuse for the men spending

their evenings as often as possible in more comfortable and attractive gas-light places out of barracks.

London, Canada West.—When the head quarters of the Royal Canadian Rifles were moved up country from Montreal to this station in July, the barracks were found much out of repair, being built of wood, and not having been occupied for several years. Much appears to have been afterwards done to render them comfortable; but there were many wants yet to be supplied, such as ablution rooms, baths, ovens for the kitchens, &c. The cubic space allotted to the men in these barracks is reported to have been of a fair average for the Command. The regiment furnished many minor outposts and detachments. The hospital accommodation at London is favourably reported on, as having been "good and ample" for the corps quartered there.

To meet the contingency of the augmenting forces at and after the end of the year, extended provisions were undertaken in renovating barracks at stations which had for years been unoccupied, in supplementing accommodation for the military in private buildings; and, under the uncertainties of the future distribution and quartering of the troops, the annexed document of "Suggestions for the Construction of Wooden Huts for Barracks and Hospitals," was issued from the War Office.

SUGGESTIONS for the CONSTRUCTION of WOODEN HUTS for Barracks and Hospitals, and for the Adaptation of Buildings for Barracks and Hospitals, in the North American Provinces, which it is desirable should be attended to as far as circumstances will permit.

Sites.

In selecting sites for huts, either for barracks or hospitals, great care should be exercised in ascertaining that the subsoil is dry and free of water; that it is self-draining, or that it admits of being easily drained. Clay ground, or other retentive soils, should, as far as practicable, be avoided.

The site should be elevated and airy, without being exposed to cold winds. Fresh water for the use of the troops should be easily obtainable.

Steep sloping ground should be avoided, if practicable; but if it must be occupied, great care should be exercised in altogether cutting off the drainage of the higher ground, by a catch-water drain, from the area upon which the huts are to be erected. The whole of the ground to be occupied by a hut camp or hospital should be carefully drained by trenching. The site of every hut should be separately drained by a carefully-cut trench about 12 or 18 inches deep; the drainage should be conveyed to a suitable outfall.

Barrack Huts.

Each hut should contain 20 men, at from 400 to 450 cubic feet per man, and from 35 to 40 feet superficial area. The huts should be arranged at distances of twice their height from floor to ridge; and a space round each hut should be paved and channelled for surface drainage.

The huts may either be constructed of logs, or of scantling and uprights, with double walls and roof. If the latter mode of construction be adopted, the space of four inches between the outer wall and the lining should be filled with sawdust during the cold weather; the sawdust to be removed in summer, so that a current of air may pass up between the outer and inner walls.

The floor should in all cases be boarded, the boards being raised about a foot above the ground, to allow a free current of air to pass underneath. Care should be taken not to heap any earth against *the sides* of the huts.

The huts should have windows on both sides, and a door, protected by a porch at either end, with a window over such door.

Ventilation should be provided by raising the ridge boards along the whole length of the hut, and by leaving a small air space under the eaves, provision being made for closing part of the opening during very cold weather.

It is desirable to warm the huts by brick stoves so arranged as to admit warmed fresh air into the huts. By this means the admission of fresh air

would not lower the temperature in the hut. If iron stoves are used, an arrangement for admitting warmed air should be resorted to.

Any modification in the ventilation, warming, drainage, &c., of barrack or hospital huts, required to suit the state of the climate, will be intimated by the sanitary officer attached to the force, through the General Officer Commanding.

Hospital Huts.

If the hospital be large, the huts should be arranged *en echelon*, so as to receive the full benefit of prevailing winds.

The floor timbers should be raised above the ground, to allow of a free circulation of air underneath the floor of the hut. The space between the ground and the floor-boards should be from 15 to 18 inches above the ground level.

The distance between two adjoining huts should not be less than twice the height of the huts from floor to ridge.

The space per bed for each patient should be, as near as may be, 600 cubic feet, and between 50 and 60 superficial feet; the space should be so disposed as to allow 5 or 6 feet at least from foot to foot of opposite beds.

The readiest material for the construction of the huts will probably be either logs, or scantlings with uprights. In the latter case, the walls and roofs should be double, with a space of four inches between the outer and inner boarding; this space should be filled with some non-conducting substance, such as dry sawdust, during the winter; but this should be removed in summer, and provision should then be made by suitable openings above and below to obtain a free current of air from the outside upwards, between the double walls and roofs.

Ventilation should be provided for, by raising the ridge boards all along the roof, and by an air space under the eaves; means should be provided for closing the openings, to ensure that the amount of ventilation so obtained is suitable to the season.

The best method of warming is by open fire-places of brick or stone, with chimneys of the same material, with a chamber round to warm fresh air to be admitted into the hut. If these cannot be constructed, iron stoves may be used, but they are by no means desirable; and in any case the arrangement adopted should be such as to admit fresh warmed air into the hut.

The windows should be placed high up, and as far as practicable in the spaces between the beds.

There should be an end window over each door, of which there should be two, one at either end. These doors should be protected by an outside porch about 5 or 6 feet wide, carried the breadth of the hut.

The porch at one end may be used for a night-chair, to be removed and emptied from the outside.

The porch at the opposite end should contain an orderly's room and small scullery.

The most convenient size of hut would be for 20 patients.

Where a hospital is required for no more than 40 sick, two huts should be placed end to end, with the scullery and a hospital serjeant's room between them.

The eaves of each hut should project sufficiently to carry the roof-water away from the foundation. It would be always advisable to provide wooden guttering to convey the roof water to the nearest surface drain.

Each hut should be provided with a verandah towards the sunny side in summer months; and a few seats should be provided for convalescents.

The surface round each hut should be paved with the readiest material, and properly sloped and channelled to carry the water away from the hut.

Water for hospital use, unless perfectly transparent, should be filtered.

A small detached hut should be provided as a lavatory for convalescents.

The hospital kitchen should be placed at such a distance that the diets can be served to the sick hot, and, as far as possible, carried under cover.

In the kitchen arrangements means should be provided for supplying hot water to a slipper bath, and some convenient place for keeping the bath should be arranged.

The hospital latrines should be situated from 20 to 30 yards to leeward. The simplest form would be a small deep cesspit, into which a quantity of earth or charcoal should be thrown every evening; or moveable vessels might be adopted, to be carried away and emptied once a-day.

The accommodation required for medicines, surgery stores, and officers' and orderlies' quarters will be best decided on the spot, after conference with the Principal Medical Officer and Purveyor.

Where marquees or tents are used for hospital purposes, the ground should be trenched to the depth of 18 inches round the site, and the earth thrown on the outer side of the trench. The floors should be boarded and raised on timbers above the level of the ground, and care should be taken to ventilate each marquee and tent by openings, suitably protected, at the top of each pole.

Temporary Quarters and Hospitals.

The Sanitary officer attached to the force is required under the regulations to inspect and report on the state of all buildings to be temporarily occupied as barracks or hospitals, and to report to the Quartermaster-General all improvements required to make them suitable for troops or sick.

The Sanitary officer will indicate in each instance the number of troops or of sick which every building ought to contain. But, as a general rule, every soldier should have at least 600 cubic feet, and every patient 1,200 cubic feet of space in every permanent barrack or hospital, and in every building temporarily appropriated for barrack or hospital purposes.

The Engineer officers will be expected to devise and see to the execution of all works which the officer commanding may authorize for giving effect to the recommendations of the Sanitary officer.

Great care must be exercised in examining the drainage of all such buildings, so as to ascertain whether there are cesspits, imperfect sewers, or other sources of foul air. And such arrangements must be made, and such engineering works must be carried out, for the periodical removal of refuse, for the construction, repair, and flushing of sewers and drains, as well as for the construction of water-closets and privies, as will prevent the air in the wards or rooms from becoming infected.

Proper arrangements must be made for ventilating and warming wards and rooms, for providing ablution and bath accommodation, water supply, and the means of cooking and washing.

The alterations required for stores, surgeries, &c., must be made.

J. F. BURGOYNE,
Insp.-Gen. of Fortifications.

War Office, December 18, 1861.

NOTE.—In all cases where it is not otherwise inconsistent with the requirement of the service, or with sanitary conditions, sites for encampment should be selected on Government reserves.

BERMUDA.

The sanitary circumstances of this virtually remote and, to the soldier, very monotonous station, varied little this year from those conditions which characterise it in respect of ordinary years, when a balance of healthiness is struck between the enervating, and, it may be said, tropical temperature of one-half the year, and a season the most bland and temperate which usually endures from December to March. The months of this latter period repair favourably the lowered energies of all, and complete the convalescence of those who may have suffered from the autumnal fevers of the climate.

Although the year under review was, generally speaking, one of the healthiest, the fact of 13 deaths, in a total strength averaging 1,013 only, seems so much an excess, looking to preventible disease, as to have called for the

following relative remark of the Principal Medical Officer, Surgeon-Major Mure:—

"I have only to offer the suggestion, that the authorities should give every assistance and facility possible to the soldier's having the means of rational amusement, so as to wean him from drunkenness, for, although there has been little sickness this year, yet the mortality tables show a melancholy fact that, without any exception, every death (one of phthisis pulmonalis, perhaps, excepted) has in a more or less degree been directly, or indirectly, caused by dissipated habits."

Advocacy has been often, in strong appeal, made for the interests of this mind-wearying station of soldiers, in order that every encouragement through comfort in their barracks (a state still sadly deficient), pleasing and healthy recreations, mental and physical, should be afforded, to relieve the embarrassment of idle hours, which are, otherwise, only sacrificed to dram-drinking and concomitant debauchery.

Some efforts would appear to have been made this year to meet so positively required an object, however partial they yet be. A new reading-room and library were expected to be finished very soon for the men, and an additional skittle-ground, to be attached to it, is advised by the Principal Medical Officer, who also proposes that both alleys should be roofed over, a necessary measure of protection for two-thirds of the year.

The sanitary measure of encamping the troops, in part, must be looked on as an accepted annual necessity under the limited and defective barrack accommodation. The general arrangements of the year, however, appear to have been such as to give about 500 cubic feet of breathing space, on average, to men in barrack-rooms, whilst in hospital the accommodation amounted to the statute (1,500 feet) of the new regulations—a circumstance, as Dr. Mure states, entirely derived from the health of the troops having been so good, for, if any considerable excess of admissions had taken place, crowding must have been the consequence, or recourse had to hospital marquees.

A good sanitary improvement had been effected at the Royal Barracks, St. George's, in creating increased ventilation by means of Venetian shutters inserted in the upper third of all the external doors, securing circulation of air across the rooms, and defeating its prevention at any time.

Increased facilities for ablution were, at several points, still great desiderata.

Extended means of varied cooking were also much wanted, for, although ovens and baking-tins had been provided, wood, the staple fuel, was not adequately supplied, but lapsed into a subject of representation and a circle of subsequent correspondence as to its being granted in sufficiency.

Provisions: Meat imported from Nova Scotia, or the States of America, gave satisfaction; vegetables, however, in sufficiency, were often a precarious product.

The light summer clothing now in general use by the troops has been pronounced very suitable for the climate.

Considerable improvements had been effected in several parts of the barrack drainage at St. George's and at Hamilton (the post of a detachment). The surface drains connected with the hired barrack buildings at the latter place were intended to be run into a deep one, and this carried into the sea: a substantial improvement this will be.

Adverting to the monotony of life at the post of Ireland Island, and the occurrence of two suicides there this year, the Principal Medical Officer looked with satisfaction to an expressed intention of relieving this detachment at shorter intervals.

JAMAICA.

The force in this Island consisted of 1,400 rank and file, of whom 635 were White troops, and 765 Black troops.

Dr. O'Flaherty, the Deputy Inspector-General of Hospitals, gives in his Report the following statement, exhibiting the mean temperature at the Upland and Lowland stations, the daily range at each place, and the differences between 1861 and the preceding year.

Mean Temperature.	1860.	1861.
Up Park Camp (Plains)	79·9	81·58
Newcastle (Hill Station)	66·9	63·00

Mean Daily Extreme of Temperature.

	Minimum.		Maximum.		Daily Range.	
	1860.	1861.	1860.	1861.	1860.	1861.
Up Park Camp	68·7	70·0	87·3	87·7	16·0	17·33
Newcastle	61·0	58·33	71·0	71·5	10·0	12·33

The heat register for the year differed little from that of the preceding one, but a much greater fall of rain is reported, and it is recorded to have spread over a longer period of days than in 1860.

At the Hill Station, *Newcastle*, sanitary improvements were effected, although some urgent ones were required, and stood over. The barracks, hospital, and officers' quarters underwent painting inside and out; new latrines for the men were completed, and the cesspit system, although still retained, was greatly improved from its previous rude state by means of trapping. A new lavatory and bath-room were provided for the regimental hospital, and a baking-oven for its kitchen.

There were still required ovens for the barrack kitchens, but which have been promised; a new lavatory shed and bath place were wanted, in addition to those already erected; the surface drainage of the station, also, required repairs, and an extension of it was desirable.

At *Up Park Camp* new latrines for the men were completed, the barracks and the hospital were painted internally, and the kitchens underwent repairs. More lavatory accommodation was required, and further surface drainage.

At *Spanish Town* several improvements took place, with regard to the hospital more particularly, glass windows having been introduced, and defended by sun shades. Other improvements were arranged in outlay for the ensuing year.

At *Port Royal* barracks and hospital, as also at Kingston barracks, painting inside (apparently the periodic measure falling generally due this year) was carried out.

As a general provision throughout the stations, the means of more varied cooking, and a supply of ovens, were anticipated; and the introduction of glazed windows for the hitherto open frame-work ones, throughout the barracks, will prove a great sanitary amelioration.

Adverting to the rationing of the troops, the Principal Medical Officer reports that fresh beef (1 lb.) was issued to white and black on five days of the week, a similar quantity of salt meat (beef and pork alternately) on the other two. A pound of commissariat bread formed another portion of the soldier's daily ration, groceries and any extra articles being purchased by the several messes on regimental arrangement.

Dr. O'Flaherty would have preferred that the troops were supplied with fresh meat every day of the week, and which he thinks could be procured at

all the occupied stations of the Island, the pasture lands nourishing and fattening excellent beef.

Fresh vegetables, as yams, cocas, cabbage, leeks, pumpkins, &c., and every description of pot-herbs, are easily procured for the troops, and in ordinary seasons at moderate rates, in quantities fully adequate to the preservation of their health. In the Upland districts almost every variety of European vegetables, and some fruits, are to be obtained.

Considering the baneful effects of rum-drinking among the troops in this, as in the West India Islands generally, the Deputy Inspector-General would advise the issue of a daily beer ration by the Commissariat to them; but the soldier's unaided pay in this colony could not meet the measure, the article being of an expense beyond his means. Intemperance is said to be a still prominent vice among the white troops, and Dr. O'Flaherty expresses his opinion that it is the constant cause of more or less disease and inefficiency in the soldier; conjoining, with the vice, the extremely monotonous life passed by the Royal Artillery stationed at Port Royal, the depressing circumstance is especially alluded to, on this occasion, of the protracted service of a battery of Artillery at this most isolated post.

In regard to the clothing of the troops, that of the Artillery at Port Royal was still too heavy for the climate, it is reported. Those stationed at Newcastle never wear the close red tunic, it appears, expect upon an occasional full-dress parade; all ordinary drills, parades, fatigues, &c., being conducted in the white linen frock recently authorised.

The clothing of the black regiments had been generally complained of as too heavy, but it is now altered, and future issues are to be of a lighter "woollen material" for both jacket and pelisse, and which must be much more suitable than the double, thick cloth jacket hitherto worn; the trousers are also to be similarly improved.

The troops had no harrass nor labour beyond the usual fatigues, to keep barracks and their vicinities clean and in good order; drills were comparatively few and short, and marches were not made, except by the black troops at the Lowland station.

Owing to the necessary augmentation of the force detached at Honduras for the first part of the year, the night duties of the black troops on the Lowlands were somewhat more severe than usual, but, taking the average for the year, they had four nights a-week in bed, whilst at Newcastle the service was so light as to admit a mean of 16 or 17 consecutive nights.

Much is still required to contribute to the healthy and leisure recreation of the troops, for, although skittle-grounds have been made, and the smaller means, as quoits, &c., provided, the greater resources of racket-courts remain desiderata.

Viewing Newcastle in its special light as a sanitarium, the Principal Medical Officer pronounces that the soldier destined to serve at Jamaica is fortunate in having such a residence secured for him, and, indeed, reverting to the military mortality in the Island of times before the resort to this up-station of the Blue Mountains, that a striking contrast in every way presents itself as to the hygienic condition of the white troops. The men, women, and children here are said to look healthy and well, free from the anæmic and bronzed appearance so generally observed in European residents on the lowlands. A good sanitary condition of the station is easily to be maintained, for, although the buildings are massed on comparatively small area of the mountain side, a strength of 500 troops, having little other duty to perform, have abundance of leisure to devote to any practicable local improvement of ground, buildings, drainage, &c., and so to add to and support their own highest sanitary welfare.

Newcastle, this year, might be said to be over-populated, in having an average strength of about 100 more than usual, and than the hut accommodation is intended for; yet the surplus was satisfactorily provided for in tents, and some of the married people were placed in wattle and dab huts, constructed by the men as temporary means of shelter. The tents were double-lined, their floors were boarded, a barrack-cot and bedding were supplied to each soldier, and the occupation of the tent was limited to three men.

It is stated that 100*l.* a-year is granted and expended in repairing and extending the drainage of the site, and it is thought that with good care and police

the drains can easily be kept in effective state. The barracks are composed of a series of huts, each one of which is thoroughly ventilated through the combined means of roof-ventilators and a large open fire-place and chimney. The windows of the huts are now all glazed instead of, as formerly, being framed with jalousies, and the improvement was one much required, in sanitary respect, at this altitude, although it is only in wet weather that they are usually sought to be closed. Extended hut accommodation is deemed by the Deputy Inspector-General as desirable, and so as to reduce the present allotted number of men to each hut, for he thinks it possible that a prevalence of ophthalmia this year may, in some degree, have been attributable to the result of numbers usually in one room ; but, at the same time, it was to be remembered that the battalion in occupation had suffered a severe epidemic of the kind three years previously at Malta, and that many of the men were still very liable to relapses of the affection.

The water supply to the station of Newcastle proves to be occasionally scarce for the number of troops, in continuance of dry weather, and, as appears, from some original defect or inadequacy of the tanks : its issue, in consequence, required to be regulated. No complaint attaches to its quality.

BRITISH HONDURAS.

The Senior Medical Officer at this outpost of the Jamaica Command, Staff-Surgeon Mr. Thornton, observes that, taking into consideration the unusual inclemency of the year, it was a matter of congratulation that the mortality had been so low, and the general health of the troops very fair, although the small numerical section of the European military had suffered much, and it had been found necessary to withdraw the detachment of Royal Artillery on account of their deteriorated health, and to replace them by blacks.

The sickness at Ruatan is exceptionally referred to as having been excessive ; but the relative documents thereon happen to be defective through the death of a medical officer.

The Bay Islands were given up to the Republic of Honduras in June of this year.

The Military Expedition of the Rio Hondo proved very fortunate as to the health of the men, every precaution having been taken to secure the same by sanitary arrangements.

At the station of Corosal, in June and July, some sickness prevailed ; but such was owing to the unusual rainfall.

In Belize, head-quarters, the black troops are reported to have been very healthy.

No alteration had taken place in the barrack or hospital accommodation at Belize. At Corosal the detachment removed in March from the old decayed barracks into the newly-built ones, but, unfortunately, too soon, and before the drainage had been properly attended to : they suffered somewhat in consequence. The accommodation in the new buildings is reported to be of about similar extent to that of the old barracks : the ventilation is spoken of as being good, but here, too, no adequate facilities have been afforded for ablution, and the means of varied cooking were still wanting, a similar necessity existing at the other posts.

The provisions of the troops were as good as the districts afforded, but, it is observed, strict surveillance required to be held over the contractors.

The parade ground at Belize became much improved by more effective drainage, but an extended system was required to reclaim the range of swamp to the westward of the barracks. Mr. Thornton suggests that, for this end, canals should be carried out to open into the river, not into the sea.

To occupy the leisure of the men, and relieve the tedium of their daily life, garden plots had been worked, but, amidst the military changes, the uncertainty of reaping where they sow is discouraging, and paid labour in their assisting to drain the grounds neighbouring to the barracks is suggested as a policy by which to occupy the abundant spare time of the troops advantageously.

The officers at Belize appear to suffer much from the dilapidated condition of their barracks, and the number of them who had been sent away for the benefit of their health is adduced as a fair test of the above inference, taken in connexion with the climate. Towards the end of the year a house (as a sanatorium) was hired for their use at St. George's Kays, and six were sent there, not with much benefit, however, as they severally had already been long in the climate, and it became too late for a residence at the Kays to benefit them. Should, nevertheless, the sanatorium be maintained, little doubt is held of its proving a valuable resort, as sick and convalescent officers can now be sent there at earlier periods, and before their constitutions become saturated with the malarious influences of Belize.

Mr. Thornton concludes his Sanitary Report with the following picture:—

"The want of occupation and the comfortless quarters are the real causes of the loss of health among the European military, for whom no social life exists at Belize. No roads are available by which to reach the open country: a muddy sea expands in front, and a swamp extends in rear: mosquitoes and sand-flies are a perpetual irritation."

THE BAHAMAS.

The following topographical sketch of of the Bahamas is extracted from the Annual Report of the Senior Medical Officer, and may be here given, as it affords a concise outline in regard to the nature of the climate, geological character, &c., and the barrack accommodation at Nassau—the military head-quarters:—

"The Bahamas consist of several hundred Islands of various magnitudes, extending in a crescentic form nearly 600 miles. They are mostly of coral formation, low, and but scantily supplied with soil: the greater number of them are uninhabited. New Providence is the most important of the group, owing to its harbour and its position in respect to the Gulf of Florida. The Island of New Providence lies in lat. 25° 29′ north, and long. 76° 34′ west, and extends about 21 miles from east to west, and 7 in breadth from north to south. It is nearly covered with stunted trees and brushwood, and is intersected with marshes and lagoons. A range of hills, about 75 feet above the level of the sea, forms a belt round the Island; upon the face of this ridge, looking north, is placed the town of Nassau, the capital of the Island, and the seat of government. In the centre of the Island is an extensive marsh; three or four lakes, containing brackish water, are situated about four or five miles to the westward of the town. Dense groves of mangroves and stunted bush, consisting of cedar, pine, &c., are to be found in their neighbourhood. The soil is very scanty, consisting chiefly of sand, with an admixture of decayed vegetable matter. There are a few small settlements scattered through the Island, peopled solely by the negroes. The climate of this Island is variable: the weather during the cold season, which extends from November to May, is extremely pleasant, the average of the thermometer being from 60° to 70°: the heat at mid-day is tempered with cool breezes. From May to November the weather is very warm, the thermometer averaging from 80° to 90°; southerly winds are generally prevalent at this season, and prove very oppressive. During the past year there has been a considerable change in the nature of the seasons, much less rain having fallen than usual, the quantity being 38 inches as compared with 65 inches in 1860. During the midsummer months there was a decided change, owing to the unusual coolness experienced, easterly and north-easterly winds were most prevalent: thunder-storms are frequent, though the history of the present year proves an exception in this respect. The Island is occasionally visited with hurricanes. During the winter months it is much frequented by Americans, owing to its mild climate, so beneficial to those suffering from chest affections. The Island is composed of limestone and honey-combed rock, which latter consists of sand, concrete, and shells; the soil is very indifferent, and merely exists in the interstices of the rock. The water-supply can be obtained to any extent, owing to the number of wells, and the facilities afforded for making others, should such be necessary. This well-water, owing to the presence of a considerable quantity of salts, is

liable to produce bowel complaints among fresh arrivals. The productions of the Island, owing to the indifference of the soil, are limited to a few of the tropical fruits and vegetables. The chief supplies of meat and vegetables are obtained from America, and the principal of the other Bahama Islands. Fish can be obtained in great abundance, and the quality is extremely good.

"The town of Nassau is well and regularly built, and remarkable for its cleanliness; it presents quite a thriving appearance, owing to the thorough state of repair in which the buildings are kept; they are composed principally of stone quarried on the island. The smaller buildings in the outskirts occupied by the coloured population, are built chiefly of wood. Owing to the nature of the soil, and the position of the town on the side of the hill, coupled with the good sanitary arrangements adopted, no nuisance can exist, and, consequently, no local causes of disease arise. The population, according to the latest census (1861), consists of whites, blacks, and coloured, the total number being 11,503: the latter chiefly live by the proceeds of wrecks, and spend the greater part of their time at sea. The sponge trade has of late years assumed considerable proportions, and many of the coloured population obtain their livelihood by procuring sponges in the neighbourhood of the various bays which are found in these seas. The barracks consist of two wings, east and west, built of stone and iron, 164 feet by 25 feet, situated on the shore, about 30 yards from the sea, with a clear frontage of several hundred yards: they are each two stories high, raised on open arches 8 feet from the ground, and are surrounded by an iron frame-work on brick pillars, supporting the roof and forming foundation for the stone-flagging of an open gallery, 10 feet in width, and completely surrounding each story, with a broad, double staircase at each end. There are 10 rooms in each barrack, and, allowing 600 cubic feet of air to each man, these would accommodate 336. There is no glass, the windows consist of moveable jalousies only. There is a centre door, 5 feet by 10 feet, communicating with each room. The barracks run east and west, with a frontage to the north.

"The kitchens, three in number, lie between the barracks and the sea—one for the use of each barrack, and one for the use of the non-commissioned officers. The wash-houses, bath-house, latrines, and urinals, are built over the sea, thereby preventing the possibility of any nuisance arising, as the tidal flow immediately removes all foreign matter.

"There are four fortifications on the Island:—Fort Charlotte, which is the largest, is situated to the westward, about a quarter of a mile from the town; the Water Battery, situated on the shore, directly under Fort Charlotte; Fort Fincastle, at the south-eastern part of the town; and Fort Montague, about two miles to the eastward."

An epidemic of measles appears to have occurred among the troops this year, but characterised as mild: 44 cases are enumerated—one only proved fatal, and through supervention of an attack of enteritis. Cases were of existence, also, among the civil population, and, in relation to this so far epidemic visitation, it is mentioned that the disease was reported to exist in like manner in the Southern States of America and among the Confederate Army, thus describing, inferentially, a geographical zone of special zymotic influences. Fever of intermittent type is instanced as having been somewhat prominent, and Mr. Mosse, Staff Assistant-Surgeon and Senior Medical Officer, assigns a probable cause of it to the exposure of the men during rifle practice, the butts being situated in a low and marshy district, the only available place for a range.

The Annual Report explicitly states that no over-crowding in barracks took place, that the ventilation of the rooms was good, whilst every attention was paid to cleanliness and other means for preserving the soldier in sanitary welfare.

In the hospital, an average number of 24 patients in the wards received a mean monthly rate of 772 cubic feet of space each. The ventilation of the establishment was satisfactory, and the climate requires no artificial heat.

Some improvements were effected in the bath accommodation, but the cooking arrangements still required amelioration.

The average strength of troops at the station was about 400 men of a black corps, the Europeans numbering 13 or 14 officers, and 9 or 10 non-commissioned officers.

THE WINDWARD AND LEEWARD ISLANDS.

In preface to this section of the Report, the following remarks on the topography of Barbados, by Dr. Ross Jameson, Deputy Inspector-General, may be given. They have more especial reference to the south-western angle of the island, embracing the garrison of St. Ann's, and its immediate vicinity.

"On approaching Barbados from the north-east, we observe a miniature Alpine country; indeed, it is popularly termed Scotland. If we take a nearer view of this district, say from Mount Hillaby, one of the most central, and the highest point in the island, we may describe it as enclosed by a semi-circular ridge, running north and south from Peco Teneriffe towards Hackleton's Cliff; near the middle of this ridge there is an intermediate one, extending from Chimbaroza to Chalky Mount, whilst, on each side of this latter, lesser ridges are found, with intervening valleys, all trending towards the sea.

"This portion of the island consists principally of strata of chalk, of different kinds of clay, different kinds of sandstone, mostly siliceous, with strata of volcanic ashes intermingled, and occasionally beds or seams of bituminous matter and coal; these strata are more or less inclined, and in some instances almost vertical.

"If we approach Barbados in any other direction, a very different scene presents itself; we observe land usually of no great elevation, and with little appearance of tropical vegetation; we perceive it rises from the sea in successive terraces, generally steep, sometimes precipitous, with intervening plateaux. We also observe that the continuity of these terrace-like elevations is not unfrequently destroyed by transverse fissures, deep, yet of no great breadth, through which occasional streamlets find their way to the sea.

"This second district comprises by far the greater part of the island; it is composed of coralline limestone, nearly horizontal beds of calcareous marl, and calcareous sandstone and freestone.

"The sanitary condition of the island is much improved by the undermentioned conditions, which all seem, in a greater or less degree, to modify the influence of the miasm and malaria to a certain extent extricated in all intertropical latitudes; these are, first, its windward position, whereby it is exposed to the full force of the trade winds, which constantly sweep over its whole extent; secondly, its small size; thirdly, its peculiar configuration, generally an open country, and for the most part without the narrow, winding valleys so characteristic of several other West Indian Islands; fourthly, the absence of land winds properly so called; fifthly, its high cultivation, for nearly every acre is devoted to the staples of the colony—sugar and Indian corn; sixthly and lastly, the absence of any marshy land deserving the appellation; to which there is but one exception of any importance, and that is the Græme Hall swamp, situated about one mile to the eastward of St. Ann's Barracks. The above conditions render Barbados less liable to the severer forms of endemic fever; but they certainly do not prevent, although possibly they may modify the cause of, epidemic fever, be that what it may. By a rough calculation, it would appear that epidemic fever may be expected about every four years, or a little oftener; the intervals are, however, very irregular; the longest on record extends, I believe, from 1822 to 1836, which was followed by epidemic years in close succession.

"Except a few men detached at the signal posts of High Gate, Gun Hill, and Moncrieffe, the garrison is concentrated at St. Ann's, the most south-western locality in Barbados, and about one mile and a half to the southward of Bridge Town, the capital.

"With reference to previous remarks on the configuration of the island in the locality of St. Ann's and its vicinity, the land rises from the sea in five successive terraces, whereof the first three spring pretty regularly one above another; the fourth and fifth, being nearly of the same height, might perhaps have been described as one, were they not separated to a certain extent at one point by a slight depression.

"The edge of the first, or lower terrace, is at no place higher than about 80 feet; it may be observed near Bay Estate, less than half-a-mile from the sea,

passing near the Principal Medical Officer's quarters; next extending on the southward and easterly direction by the ruins of the Naval Hospital, then following an easterly course, till it winds to the northward of Græme Hall swamp, where it becomes mixed with the second elevation; this last may be observed near Kingston House, thence trending due south towards Pilgrim, the Governor's residence, and Bishop's Court; next, turning southward and eastward, it is styled Britton's Hill; after which, proceeding nearly east, and parallel to the first hill above Græme Hall swamp (as already stated), it is intermingled with the lower plateau; the highest point is about 180 feet above the sea.

"The third terrace springs from two points, the one above Pilgrim, at a spot called Grand River (170 feet), the other to the eastward, at Two Mile Hill (210 feet); after running in a southerly direction, near Pine estate, both unite; then passing High Gate, where it reaches an elevation of nearly 259 feet, it becomes Clapham Hill, and continues its easterly course for several miles; a little to the eastward of Two Mile Hill is the chapel of St. Barnabas. Near this we observe the fourth terrace, which, after running due south, turns sharply to the east, a little above High Gate and Clapham, near a house called Wildey's; it then runs in an irregular, but eastward direction, for some distance, in this neighbourhood reaching its highest elevation (410 feet), near Adam's Castle. The fifth terrace, being but faintly separated from the preceding, is observed just to the northward of Adam's Castle, not far off the boundary stone, and, if we reverse our steps, it can be traced proceeding in a westerly direction, by the ruins of Fort George (its highest post 391 feet), then due north; next, turning eastward (at this point higher than the fourth terrace), it passes by Hanson's estate (350 feet), and continues for some distance further, gradually descending, and overlooking in this course the Great Valley, opening to the sea at Bridgetown, and which separates this elevation from the opposite northerly one (styled the Great Cliff Terrace), on which are situated the posts of Gun Hill and Moncrieffe.

"If we revert to the first, or lowest terrace, we observe an offshoot therefrom, running southward from a point near the Principal Medical Officer's quarters, past the Resident Engineer's quarter, Artillery Barracks, Main Guard, and Officer's Stone Barracks, till close to the sea, where, at the Storekeeper's quarters, it turns to the east, is observed at St. Ann's Castle, and sinks to the level of the sea beyond the hospital buildings, at the village of Hastings. On this offshoot of the lowest terrace, at a height varying from 20 to 80 feet, we find a considerable portion of the barrack and other buildings, of St. Ann's, also the parade ground (about 40 acres in extent), here popularly styled the Savannah.

"A narrow strip of ground is observed between the sea and the first, or lowest, terrace, including its offshoot just described; here the rest of the public buildings are placed. Its breadth varies a good deal; behind St. Ann's Castle it is a few feet only. As we proceed eastward, however; the distance from the terrace to the sea increases considerably. I am told that all this ground, including even the greater portion of the offshoot now occupied by barracks, was formerly a marsh. At any rate, the swamp, already referred to as being by far the largest in Barbados (Græme Hall), is placed at the eastern extremity of this district. Between the hospital and the said swamp the distance is about one mile.

"If the above description has rendered the leading features of this locality of St. Ann's intelligible,* we must admit that its original selection as a military station was most unhappy—in the most leeward district of the island, on the lowest point of that district; the ground itself, originally marshy, being in the neighbourhood of what still is almost the only swamp in the island. The same disregard of sanitary advantages is observed in the position of the buildings; the *older* ones, the men's stone barracks, for example, being placed on the strip of land between the offshoot of the lowest terrace and the sea. Besides these buildings, although themselves well built and substantial, in their general construction, are in some points faulty, when regarded in a sanitary point of view.

* A small lithographed chart is attached, for more ready topographical delineation.

SKETCH OF THE COUNTRY
SURROUNDING THE GARRISON OF St ANNS,
BARBADOS

Showing the various heights above the Sea, and the relative positions of the Government Lands

Day & Son Lith.rs to the Queen

"I mention these points, but as they cannot now be altered, I hasten to what is practical—to inquire, have the inherent defects of the locality itself, of its occupation, and of the style of buildings thereon erected, been remedied *as far as possible?* I am free to admit that, during late years, great improvements have been planned and carried out, whilst some, I believe, are still in progress, and others under consideration.

"I would especially note that deep drains have been laid down, and several surface ones. On this last point I cannot pronounce with certainty, yet I think that the drainage of the south-eastern aspect of the Savannah might be rendered more complete.

"It has already been remarked that the public buildings of St. Ann's are substantially built; and, as long as a sufficient number of cubic feet and adequate floor space are allowed to each individual, in any of these barracks, during ordinary years, the average mortality among the inmates may be expected to be comparatively small, if the troops are acclimatized.

"The rooms of the upper story of the Iron Barracks, and also of the Brick Barracks, may be termed good, convenient, and well ventilated, although it would be better if the iron jalousies in the former were replaced by wooden ones, moving on a central pivot, and opening and shutting with facility.

"On the whole, I think the Men's Stone Barrack (built as far back as 1796), from its site and dimension, is altogether the least adapted for troops, and should therefore strongly recommend that, if possible, European soldiers should never be quartered in the lower rooms.

"The most objectionable feature of this station is the position, and especially the general condition, of the urinals and latrines. The former, and some of the latter, are supplied by buckets, and emptied nightly. The majority of the latter are pits walled up, opened and emptied occasionally. Chloride of lime and disinfectant fluid are used; every care is taken to keep them in a proper state; still, the result is not wholly satisfactory—they are frequently offensive.

"I think pits, for obvious reasons, the worst of all plans; removal of the soil by buckets, nightly, by *dirt-tight* carts, is a much superior method; but on the whole, if practicable, the best system is to carry a full and continuous stream of water through both urinals and latrines. This has been practised at railway stations, and with satisfactory results.

"The question here arises, Is this last plan practicable? Is the supply of water sufficient? Can it be easily raised, and carried through proper channels to the site required? Would the expense be great? As the above points are now under discussion, I will defer the full consideration of the subject generally till a future opportunity; for the present, merely observing, in conclusion, I am inclined to believe the plan is quite practicable, although possibly it might be expensive.

"The defective accommodation in the Brick Barracks for married soldiers and staff sergeants, the small size of the guard-room there, and of the ablution-room, have all been reported home to the proper authorities repeatedly. It seems, therefore, unnecessary here to allude to these deficiencies in detail, for they have already formed a subject of correspondence.

"I only take this opportunity of expressing a hope they may be remedied as soon as possible."

Diet.—Reporting generally on sanitary matters, in relation to the islands where the military were stationed, Dr. Jameson states, with regard to the provisioning of the troops, that on the whole the ration supplies were good. Vegetables and fruit, however, did not seem anywhere as plentiful and cheap for the means of the men as could have been desired; thus, in his experience, forming a striking contrast to Jamaica, where both are most abundant and always fresh. In Barbados, fruit is mostly imported from the other islands; and, in regard to vegetables, deficiency is more particularly felt at St. Lucia, where, it is regretted, the authorities have not yet encouraged garrison-gardening to any favourable result as a sanitary measure.

Means of Cooking.—Adverting to the state of cookery for the troops, the Deputy-Inspector-General observes that the introduction of the more recent inventions, as Grant's apparatus, Flavell's range, &c., would be of especial benefit as to economy of fuel, whilst the soldier would reap the advantage of variety—no small consideration in a climate where appetite is at times prone

to be capricious. In some instances suitable means, as ovens, have been put up; but the composition of the modern ration, generally speaking, is not found to be quite sufficient to the end of frequently varying the diet; it is represented that, if the men could be supplied in sufficient quantity with wholesome and cheap vegetables, there would be little more to recommend under this head.

Duties.—The duties of the troops throughout the Command appear to have been in no respect severe, or prejudicial to health. The averages of five to ten successive nights in bed to one on guard fell to the share of the white troops, and four and five to the black.

At George Town, Demerara, however, for the last eight months of the year, the detachment of black soldiers had certainly too few nights in bed, owing to the circumstance of the strength of the garrison having been reduced by the removal of the detachment of the 21st Fusiliers to Belfield, as a sanitary measure during the existence of yellow fever in George Town. The black troops, nevertheless, did not suffer in consequence.

Clothing.—Where the troops had unconditionally laboured under the regulation wear of the red cloth tunic on garrison duties, the relief afforded by the introduction, this year, of the modified dress for tropical and semi-tropical climates is prominently acknowledged.

The principal sanitary proposals submitted at the different stations are given at length in the annual report by Dr. Jameson.

At *Barbados*, Dr. Jameson's attention had been directed, soon after his joining and assuming sanitary superintendence in 1859, to the defective and inferior quality of the water-supply to the garrison of St. Ann's. It was obtained either from wells within the boundaries of the garrison, and raised through the uncertain agency of windmills, or from rain tanks. When these sources failed, it had to be purchased by the Commissariat.

The system of drainage and sewerage, also, he conceived to be defective; the condition of the urinals and latrines objectionable. For remedy of the latter it was evident that a continuous flow of water should be directed through them, after certain necessary alterations in their construction and in the position of the drains. But an adequate supply of water, from existing sources, within the garrison, being unobtainable for the above purpose, the Principal Medical Officer conferred with a Company recently formed to furnish the city of Bridgetown, obtained an analysis of the springs whence the supply was to be derived, and ascertained the probable quantity which would be daily at their command at all seasons. The quality proved to be the very best to be obtained in the island, and it became tolerably certain that, for all domestic purposes of the troops, sufficient quantity could be laid on for the garrison even during the driest year.

A sanitary boon so paramount for the troops in this climate was strongly advocated by the Director-General, Dr. Gibson, C.B., on his bringing the above proposal of supply under the consideration of His Royal Highness the Commander-in-Chief, who, receiving further a communication from the General Officer in the Command, was pleased to recommend to the Secretary of State for War that an agreement should be entered into with the Bridgetown Water company for an abundant supply, in lieu of the expensive and uncertain one derived from existing arrangements.

The terms of supply proposed by the Company to Her Majesty's Government were as follows:—

1. To supply, by contract, the garrison of St. Ann's with any quantity not exceeding 30,000 gallons per day at the sum of £500 per annum.
2. In the event of a larger supply than the above 30,000 gallons per day being required, the quantity in excess to be charged at the rate of 1*s.* per 1,000 gallons.
3. The Company to lay down a 4-inch main in the public roads, or across the Savannah, to the several barracks and the hospital pavilion at their own expense.
4. The Company also to lay down the service and distributary pipes to the various barracks or buildings as required; but this at a cost to the Government similar in scale to that charged to the inhabitants of the city.

5. The Government to enter upon a contract for a seven years' supply, or to reimburse the Company for their outlay on the 4-inch main.

An analysis of six samples of water from several springs in the island of Barbados, by Professor Spencer, is appended, including Hatchett's River (the Company's source) and Beckles' Spring, the source from which the garrison has been occasionally supplied in times of scarcity within St. Ann's, before referred to.

Composition.	Places whence Samples were taken.					
	Cole's Cave.	Hatchett's River (Company's).	Codrington College Springs.	Purrey's Springs.	Three Houses Springs.	Beckle's Springs.
	Grs.*	Grs.*	Grs.*	Grs.*	Grs.*	Grs.*
Carbonate of Lime	7·30	8·28	10·18	7·50	14·10	14·04
Carbonate of Magnesia	0·60	1·50	1·45	0·55	3·26	2·50
Chloride of Sodium	4·05	5·10	5·80	4·20	5·90	6·04
Carbonate of Soda	..	3·05	2·55	..	..	..
Sulphate of Lime	..	..	..	0·30	0·55	..
Organic matter	..	0·33	A trace	A trace	..	..
Silica	0·28	0·46	0·45	0·43	0·59	0·36
Total	12·23	18·72	20·43	12·98	24·40	22·94
Hardness† { Before boiling	8·2	9·2	13·0	8·1	17·0	16·5
Hardness† { After boiling	4·2	6·0	5·1	5·5	7·3	7·0

Upon the results in this Table the analyst observes that, though some of the samples are harder than others, the waters are all excellent, and adapted for every dietetic purpose, also free from organic matter, the traces of which in only three of them being very slight indeed. It is further remarked that even the hardest samples soften considerably after boiling for a few minutes, as compared with the chalk waters of Great Britain, and also that they exhibit the peculiarity of an almost entire absence of sulphuric acid, which circumstance renders them still more valuable for domestic use.

Of the water obtained from the "windmill" well attached to the brick barrack (that occupied by the regiment of the line) the following analysis is reported to Dr. Jameson by Mr. Harrop, dispenser:—

Ingredients.	Grains in an Imperial Gallon.	
Carbonate of Lime	18·50	33·00
Carbonate of Magnesia	2·00	
Chloride of Sodium	10·50	
Organic matter	A trace	
Silica	2·00	

A total of 33 grains in a gallon, in contrast with 18·72 in the sample from the new Company's source.

The terms of contract were settled with the Bridgetown Company in the course of ensuing months, and all arrangements of pipeage, &c., concluded. The new water-supply was laid on to the barracks and hospital on 30th October, 1862.

At the Island of *St. Lucia* no sanitary alterations of any importance came into effect this year. For the purpose of flushing latrines, urinals, &c., the erection of an iron tank, large enough to contain a sufficient quantity of

* In an imperial gallon. † In degrees of Clarke's scale.

water, and to be placed on the summit of the Morne, was suggested by the medical officer in charge, and concurred in by the officer commanding, with a view to the proposal being included in the next estimates. The want of occupation for the married families of the, now-a-days, small detachment at this station, is noted, and a suggestion thrown out that there is sufficient space on the Government property to erect a row of cottages as special quarters for them, apart from the general barrack.

Trinidad.—In the spring instructions were received from the Secretary of State for War, conveying his decision that a small trial-hut for twenty men should be erected at Trinidad. The site selected was on the lowland district (the Savannah, Queen's Park, near the chief town Port of Spain), and at no considerable distance from the present St. James's Barracks. Difficulties had beset so far the question of a supra-marine elevation for white troops in the island, that this, the great sanitary desideratum, lapsed after much search and discussion. Finally objection was taken by the Colonial Government, it is understood, to the erection of the trial-hut in the Queen's Park, and, under doubt as to continuance, it was alleged, of the occupation of the island by white troops, the intended trial measure did not proceed this year.

At the St. James's Barracks, those of the European troops, an additional supply from the water-source of Maraval was still desired. Improved cooking means had been furnished. Had the original intention of cantoning the white troops on a mountain site been realized, the St. James's Barracks, it was expected, were to be made over to the Black Troops, whose present barrack, in the town of Port of Spain, would then have been restored to the colony. The intention, however, having fallen into abeyance, the latter buildings, old and defective, were submitted to several necessary and useful alterations and improvements at the suggestion of Surgeon-Major Elliot, C.B. The old quarters, occupied by the married men, were pulled down and new ones obtained for them in the vicinity (former police-barracks). Certain obscured drains were discovered, duly repaired, and rendered effective. An old well, which had long served as a receptacle for rubbish, was filled up with lime and bricked over ; and the parade-ground was improved by levelling.

British Guiana.

Demerara.—On the 26th of May, yellow fever appeared at George Town among the lower order of the population, and cases were admitted to the civil hospital from the shipping in harbour. In precaution for the safety of the white troops, the detachment (1st Batt. 21st Foot) was removed from Eve Leary Barracks to Belfield, a distance of about fifteen miles by railway, and there placed under canvas. The disease continuing in varying degree of prevalence at George Town, the troops were detained in camp until the end of the year.

The site of Belfield is described to be on the sea-coast in an easterly direction. It had been decided upon in the previous year as the most desirable one to meet a contingency of the kind. In the camp arrangements a tent was allowed for every four men, the diameter of each tent being about 15 feet. An urinal was built over a trench, and latrines, of wooden construction, were placed over a pit dug in the ground, and the frames were removable, as required, to fresh sites. An ablution-house, also of wooden frame, was erected over a large trench, and provided with wooden basins, supplied from a tank. The men had further an advantage in facility of bathing in a place adjoining the camp, where one of the large trenches communicated with the sea. The drainage, sewerage, and general sanitary condition of the camp were soon improved after taking occupation, and before a second month had passed were pronounced to be very good. The drainage was effected by trenches of various sizes intersecting each other, and thus conveying the surface water into the sea through the "Koker" at low tide.

A small wooden building at the margin of the encampment was put to the use of a kitchen, and furnished with Flanders kettles ; the arrangement proving a commodious one.

The building selected for the hospital was one of wood, and of two storeys, facing the north, raised two feet from the ground by blocks of wood resting on

stone. The ventilation of the building was very satisfactory, and the cubic contents of the apartments admitted of an allotted ward-space averaging about 720 cubic feet per bed. A large marquee was fitted up as a kitchen. The latrine was placed conveniently at the back of the building, and a tent was pitched in the neighbourhood to serve as a dead-house.

The water-supply for the camp was collected from the roof of the hospital and conveyed into a tank capable of containing 6,000 gallons, the fatigue-parties drawing the requisite quantities morning and evening. The quality was good, but the quantity, at first abundant, ultimately fell short with the drier season, and had to be supplemented by barrel-loads sent daily by railway from George Town.

Within sixteen days of the date of arrival of the troops in camp, there were in all seven mild cases of yellow fever reported among them, but not a single one presented itself after that period—a circumstance which, with the fact of the detachment remaining subsequently free from all serious disease at the camp, and under the very rea sonable inference that the above seven cases were germinated before the menleft George Town, the Principal Medical Officer adduces in proof of the early and distant encamping of the white troops being a successful sanitary measure.

Could the removal of the European detachment to Barbados have been at once practicable, the more certain sanitary course would have been fulfilled. This more thorough measure was, however, recommended by Dr. Ross Jameson to the military authorities, as indispensable in the event of yellow fever generalizing itself beyond the boundary of George Town, or in any way showing an approach to Belfield.

THE WEST COAST OF AFRICA STATIONS.

Sierra Leone.—The force on this part of the coast averaged about 19 Europeans (of whom 16 were the Regimental and Staff Commissioned Officers), and 368 black troops.

In regard to the circumstances of the climate this year, the only one worthy of remark was the almost total absence of "tornadoes after the rains," of which there appears to have been a diminished fall.

The usual amount of zymotic disease is reported to have taken place, as in all ordinary years.

Of the barrack accommodation Mr. Morphew, Staff Surgeon, represents the position to be good in regard to elevation, aspect, and neighbourhood; in this referring more particularly to Tower Hill, Freetown.

Of the averages of occupation, about 16 men to a room obtained an annual mean of 854 cubic feet each. Much complaint had been made of the defective and leaky state of the roofs of the officers' quarters, but remedy of all this must have been anticipated.

The sanitary adjuncts of good ablution means and of facilities for varied cooking were still a great want at the station. In regard to other hygienic arrangements the Staff Surgeon conceived there was no local cause of preventible disease in the immediate vicinity of Tower Hill Barracks.

The duties of the troops appear to have in no respect prejudiced their health; and, although some of them were engaged in active field operations for a time, no unfavourable results to their general condition were found to be a consequence.

In the way of exercises and recreation for the troops none appear to have been considered; the climate does not dispose, and, it may be inferred, the disposition of the native soldier does not incline, to pursuit in this direction.

Referring to the diseases of black troops, Mr. Morphew alludes to the susceptibility of the black soldier to chest disease, and to which he is very liable on exposure, and more particularly during the "Harmattan" season of the coast —such disease tending greatly to mortality. The coincidence is also very remarkable in the service of these troops in the West Indies.

Of the principal hospital accommodation—that at Freetown—the report

gives a good account; an average number of men—13—obtaining a mean rate of about 3,000 cubic feet of space each in the wards.

The wants of a bath-room and ablution-house were the main defects left to be included in the estimates for the following year.

Of the *Gold Coast* stations a less favourable annual report is presented by Staff Surgeon O'Callaghan, the Principal Medical Officer. He states the climate to have been, generally speaking, very adverse to health this year, both among the civil and military populations, remittent fever of a severe character having been very prevalent. Comparatively little rain appears to have fallen, and the summer and autumn proved very unhealthy, "scarce a single European escaping an attack of fever."

The average strength of the Gold Coast Corps was 305 black troops and 19 Europeans, 17 of whom comprise the regimental and staff officers. The troops were in majority stationed at Cape Coast Castle and Accra, small detachments being quartered at Anamboe and Dix Cove.

Adverting to the several positions occupied by the barracks, the Staff-Surgeon states them to be invariably unfavourable to health, inasmuch as they are situated on ground but a few feet above high water mark, the heat being excessive, and the air more impure than on the surrounding hills. During the rainy season the lower levels are enveloped in mist, whilst the hills are clear of it: and the occupants of the barracks are subjected to the influences of the products of decomposing organic matters in contact with sea-water—the fruitful source of much disease here Mr. O'Callaghan thinks, and he conceives the sites to have been injudiciously chosen; further observing, that the ventilation, in many of the barrack-rooms, is very imperfect, in consequence of their position and structural arrangements—of the basement rooms more especially, some of these being below the level of the sea-batteries, and their windows being small. During the last six months of the year, however, several important improvements are reported to have been made, contributing to the health and comfort of the men; and the official inspection-visit of Captain Noble, R.E., at the close of the preceding year, was expected to be productive of many other sanitary as well as general improvements in the condition of the forts; but none of these, however, had yet been undertaken.

The want of ablution and bath accommodation specially in all the barracks was, perhaps, less a necessity, as the sea flows up to the walls of the forts, and the facilities are ample for bathing, to which the troops freely resort.

These troops (the Gold Coast Artillery) are left to diet themselves; and the Medical Officer regrets their not being rationed by the Government, their own purchases being almost entirely of fish, fruit, and vegetables—a regimen which he finds to be inadequate for the fatigues and duties the men have to undergo. He advises a Government ration of meat for them twice a-week.

The troops are entirely dependent for water, for drinking and culinary purposes, on that collected from the roofs of the buildings into tanks, and, as the rainfall of this year was very small, the allowances had to be limited.

In regard to the dress (the Zouave pattern), favourable mention is made of the "lighter material" lately introduced for the make of the trousers, which article of the attire, however, is experienced, on the African service, to be too full and baggy, and therefore liable to be torn in "bush" marching.

In regard to the main hospital accommodation at Cape Coast Castle and Accra, the mean of cubic space for the sick amounted to 1,400 feet to a patient, and, in most respects, the conditions were very satisfactory. At the former station, a large, commodious house had been rented conjointly by the Military and Colonial Departments, in the upper story of which was arranged the Military portion. At Christianborg Castle (Accra) the chapel, not being used specially, had recently been converted into a hospital for the Military, and as far as space, light, and ventilation were concerned, it was pronounced to be very perfect for its object. The accessories of latrines, ablution accommodation, cooking, &c., had here to be more or less of extemporized arrangement. The water-supply to these hospitals was of roof-collection and from the barrack tanks, filtered before drinking use.

Adverting to the condition of the European officers serving on the Coast and to the forts in which they are quartered being so low (on the very margin of the sea) and damp, the Principal Medical Officer puts the question—"is it to be wondered at that they are so sickly and so frequently invalided to either

Madeira or England?" and it is again suggested that the great sickness and mortality among them might, in a very great degree, be diminished by erecting, on any part of the surrounding hills, a sanatorium for their benefit.

Staff-Surgeon O'Callaghan, in reporting on the state of vaccination on the Gold Coast, makes the following observations:—

"Until the year 1861, I believe, a signal failure attended the endeavours. In the early part of this year, however, a few Dutch soldiers at the neighbouring fortress of Elmina having been successfully vaccinated, some of the men of the Gold Coast Artillery were vaccinated from them; and by this means the virus was successfully communicated to 138 of our men. Amongst the civil population of the Accra District, from 20th November, 1860, to 5th September, 1861, I gratuitously vaccinated 1,824 individuals, and of these the operation failed in only 17 instances; all the others presented full and perfect vesicles." Great care must have been devoted to this self-imposed and humane duty.

The *Gambia*.—The sanitary report of this station for 1861 is void of any range of special details as to hygienic conditions of improvements or otherwise; and, with reference to alleged causes of sickness and mortality, the Medical Officer in charge, Staff-Surgeon Mr. Curtiss Martin, sums up solely as follows:—

"The cause of the greater part of the sickness and mortality* among the black troops arose from insufficient clothing and from exposure to wet during the rainy season. These circumstances, with their recent arrival from the West Indies, and the hardships suffered by the men subsequent to their wreck on the troop-ship which conveyed them, will doubtless explain the numbers."

CAPE OF GOOD HOPE.

Reviewing the seasons of this year, Mr. Taylor, C.B., Inspector-General of Hospitals, has remarked that each proved a healthy one; and, in showing that the ratio of sickness and mortality had been under the average of any former series of years, attributes the circumstance not a little to the ameliorations of the sanitary conditions of military service introduced of recent years. As to local improvements in course of the year under review, several minor alterations were made in guard-rooms and cells; but, in regard to the more general accommodation of the troops throughout the Command, little or no change is said to have taken place.

It is represented that about 3,062 of the whole force (the average total strength being 4,396 of white troops and 166 of black) were lodged in stone and brick buildings, but only a small proportion of these having wooden floors, in many (the outposts) the floor being simply earthen.

Ventilation is said, in most rooms, to be specially provided for, and, in the majority, to be greatly augmented by imperfections in the building.

From Mr. Taylor's further description, huts of wattle and daub, with earth floors, and thinly-thatched roofs, accommodated 789 men, whilst the remainder of the force to be accounted for (about 670) were constantly under canvas during the year; and it is reported that only by occupying a number of tents, at various stations, can a moderate cubic space in buildings be attained.

Upon the state of latrines, &c., ablution and bath-rooms, Mr. Taylor's Report states, with reference to the former, that the tub system still prevailed at all stations, including even Cape Town, notwithstanding such urgent representations of a necessity for improvement had been made to both military and civil authorities, through whom were entered repeated protests by the Inspector-General against the superficial drainage and sewerage of Cape Town, as being dangerous to the health of the troops, inasmuch that a line of its conduit passed actually into the ditch of the Castle Barracks. A work of a total remodelling of the drainage was afterwards decided on by the municipality, to embody a renovation of the whole upon scientific sanitary principles.

With respect to means of ablution, adjacent rivers, at most stations, supply the place of resource; and at none of the leading stations are the appliances yet furnished of bath and ablution accommodation at all adequate to the views

* Twenty deaths in all in an average strength of 430.

now-a-days held by every one as to these important aids to the health of congregated men.

In cooking means for the troops, improvements were effected this year at Cape Town and King William's Town; but at other stations they remained limited to the old boilers, camp-kettles, and the open fire-places.

In regard to the rations of the troops, the scale of regulated quantities remained unaltered, and quality of the articles was rarely a subject of complaint.

A properly organised system of military canteens throughout the Command continued to be very desirable. At few of the stations do these regulated establishments exist, and the drinks otherwise obtainable are pronounced to be of very inferior and deleterious quality.

Satisfaction was found with the clothing of the troops generally, and its wear was duly varied according to the season. The clothing of the Cape Mounted Rifles was deemed unsuitable by the Surgeon, and his special objections to it were represented to the local military authorities. The newly-established light clothing for the hot months had not yet been received.

The range of duties this year was of the very ordinary demand, and four or five nights a-week in bed are given as the average to each soldier.

On the subject of the hospital accommodation generally, the Inspector-General observes that no over-crowding anywhere took place; but that at several of the stations marquees had been used on occasions in aid of the space in the permanent buildings. The long-represented want of proper hospital accommodation at the small station of Port Elizabeth was supplied by the transfer and erection there of one of the new wooden huts of the intended sanatorium at Wynberg, the preparatory works of which were given up on a decision of the authorities not to proceed with the establishment.

Adverting to the diseases during the year, Mr. Taylor represents ophthalmia as being the only one that could be called specially prevalent among the troops. Various causes for this condition were assigned by medical officers, but he was inclined to consider the affection (an extensively chronic one) to be of a land-scorbutic nature, partly due to high temperature, and partly to the absence of a sufficient quantity and variety of vegetables and fruits of a fresh and succulent nature.*

Ambulance.—The means of transport for sick and wounded had during the preceding year been under consideration, as a question of special supply to meet the exigencies of any future war in this colony, and in order that decision might be arrived at as to the best form and construction of an ambulance wagon designed to suit the peculiarities of frontier service, and adapted to the means of draught, and the general nature of the roads. The question was eventually submitted to a Committee, assembled at King William's Town, for report, when, after giving the subject the best consideration, the members recommended the adoption of the following propositions, in submitting their proceedings;—

"That fittings be supplied, which could be fixed to the common wagons of "the country, to enable each to carry from four to eight men, according to the "nature of their cases, the method being as follows:—Behind the fore-chest "(driver's seat) a seat to be suspended on springs across the wagon, and to be "divided into two compartments, similar to those of a first-class railway carriage, "with a foot-rest attached, supported on spiral springs; the seat and foot-rest "to be connected by pieces of wood fixed together with elastic bands; behind "this, one or two cots to be suspended longitudinally, each to hold one man; the "cot to be constructed of light wrought-iron, made as portable as possible, and "to be adapted for carrying wounded from the field, and to be placed and fixed "in the wagon without moving the man from it; the cot being suspended in "the wagon on C springs, and the lateral motion prevented by attaching spiral

* The scarcity and dearth of vegetables at many of the frontier stations induced Mr. Taylor to propose to the Military Authorities that their provision should be obtained by a Commissariat contract, and his recommendation was urged for favourable consideration by the Home Authorities, who have decided upon rations of preserved vegetables being supplied to the troops at those posts, according to necessities.

"either to the cot or to the side of the wagon, whichever may be found advis-
"able. A seat, similar to the one just mentioned, to be suspended at the back
"of the wagon; the whole of the fittings to be constructed so as to be easily re-
"moved, as well as to be adapted to any circumstances; the cots to be supplied
"with a good hair or coir mattress and pillow, and with a covering attached to
"the pole to shelter the occupants from sun or rain; two air pillows, that can
"be inflated at will, should also be kept with each wagon.

"The Board is, however, of opinion that the practicability of this proposi-
"tion should be tested, by one wagon being fitted up, the cost of which, it is
"believed, would not exceed 20*l*.

"The quantity of ambulance conveyance must, of course, depend upon the
"number of troops, and nature of the circumstances in which they are placed;
"but the Board would venture to recommend that, should the proposition before
"made be found the most suitable, or best adapted for the service in this
"country, that fittings for twelve wagons be always kept ready for use.

(Signed) "Arthur Home, Colonel and Lieut.-Colonel
2nd Battalion Light Infantry, *President.*
"J Armstrong, Colonel Cape Mounted Riflemen,
"C. Portgeiter, Assistant Commissariat-General,
"John Mostyn, Staff Surgeon,
"J. Grantham, Captain Royal Engineers. } *Members.*

"*King William's Town, 23rd March*, 1861."

MAURITIUS.

Dr. Archibald Gordon, C.B., the Deputy Inspector-General of Hospitals, pourtrays the health of the troops throughout the Command to have been, this year, highly satisfactory, indeed, to have equalled that enjoyed in any part of England, the deaths more directly ascribable to climate having been singularly few; yet the barrack accommodation is represented to be much too limited for the strength of troops, although a portion of the quarantine station had been given up by the civil government, to supplement the requirement on this score. This latter accommodation, however, it appears, cannot be depended on as a permanent one, but is subject at any time to be demanded for its more especial purpose; and this leads to Dr. Gordon's express opinion that the barrack accommodation, taking the troops at their present strength (an average of 1,921 this year), ought to be extended, a question which, he thinks, should meet with no delay, and, indeed, looking to the tropical character of the climate, in connexion with the generally inferior description of the barracks in modern sanitary estimate, the need of extension and improvement for the soldier's comfort, and greater security of health, is based on valid reason, for, in the rotation of years, one of epidemic visitation every now and then occurs, with deadly influence, to counterbalance the results of intermediate ones however healthy, comparatively, these may have been.

Adverting to the sanitary measures carried out, Dr. Gordon refers to what had been a long-endured nuisance, the effluvium at the Military Hospital of Port Louis, arising from a drain leading into the sea, and which at low water was uncovered; this evil was thoroughly remedied by a sea wall having been completed over it, and which had the effect of counteracting the nuisance entirely. The hospital latrines, however, still required conversion to an improved system which had been recommended.

The Deputy Inspector-General considers the ventilation of the barracks and hospitals, generally, from their construction, to be sufficiently good; but, further, he deemed it advisable that the wooden "storm shutters" in the several barracks should be perforated, so as to obviate the evil effects arising from sleeping in the close and vitiated atmosphere of the rooms, when circumstances of weather compel to have those shutters closed.

With reference to the Military Hospital at Port Louis, finding but little prospect of the construction of a new one on a more appropriate site within

any early period, Dr. Gordon advises the addition of verandahs to the present one, to add comfort and convenience for the patients.

The means of cooking, generally, in the different barracks throughout the island, demand great improvement still, as nothing appears to have been done in course of the year to achieve variety in the preparation of the soldiers' dinners. But, on this subject, representations have since been urged, and satisfactory results may be anticipated. Meanwhile, procedure had been taken, and an estimate made for an improved kitchen apparatus to be furnished for the garrison hospital at Port Louis.

No change took place as to the quantity of the soldiers' ration, the articles composing it being pronounced as good as the island could produce. At several of the out stations, however, a scarcity of vegetables was found to prevail, and at one of them, Cannonier Point, it became requisite to issue for several months an allowance of sugar and lime juice to the men, in consequence of scurvy having shown itself amongst some of them.

The clothing of the troops was experienced to be quite suitable for the climate, with exception as to the Royal Artillery, who had not, up to the close of this year, been supplied with the appropriate light materials for the hot season.

In regard to ablution means throughout the Command, behindhand as they may be inferred to be in regard to modern improved appliances, baths, &c., the Sanitary Report, in its general showing, represents that they may be considered sufficient upon the whole, as at most of the military posts there exists free access to the sea at all times.

As the meteorology of the island may afford a somewhat special interest, concentrated in that of the rotatory hurricanes which sweep this region of the ocean, the Table for the year is subjoined.

The observations in the following Table were made at the Civil Observatory, Port Louis, and, from it, furnished to the principal Medical Officer.

METEOROLOGICAL TABLE for the Year ending 31st December, 1861.

Observations.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Average for the Year.
BAROMETER.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.
Mean at 9½ A.M.	29·905	29·666	29·946	30·034	30·055	30·130	30·188	30·189	30·199	30·115	30·020	29·937	30·03
Mean at 3½ P.M.	29·945	29·589	29·887	29·961	29·977	30·056	30·112	30·116	30·110	30·036	29·955	29·575	29·85
Highest reading in the month	30·011	29·986	30·083	30·109	30·127	30·246	30·253	30·304	30·279	30·208	30·076	30·018	30·14
Lowest reading in the month	29·544	29·050	29·282	29·897	29·893	29·945	29·977	30·016	30·006	29·951	29·844	29·773	29·68
Range in the month	0·467	0·906	0·801	0·212	0·234	0·301	0·276	0·288	0·273	0·257	0·232	0·245	0·376
TEMPERATURE OF AIR. (Dry bulb Thermometer.)													
Highest temperature in the month ..	88·0	87·5	85·8	85·5	82·2	79·8	76·0	76·0	76·9	81·0	83·5	86·5	82·2
Lowest temperature in the month ..	76·5	72·0	75·0	74·0	72·0	67·2	68·2	67·8	68·0	70·5	73·0	76·0	71·6
Range in the month	11·5	15·5	10·8	11·5	10·2	12·6	7·8	8·2	10·9	10·5	10·5	10·5	10·8
Mean highest temperature during day ..	85·0	82·1	82·4	82·1	79·4	75·1	76·8	74·0	76·0	78·1	81·9	83·6	79·5
Mean lowest temperature during night ..	79·6	78·1	77·4	76·6	73·9	71·1	70·0	69·4	70·2	79·2	75·4	78·9	74·4
Mean diurnal range	5·4	4·0	5·0	5·5	5·5	4·0	4·8	4·6	5·8	5·2	6·5	4·7	5·0
Greatest diurnal range	9·5	7·5	6·8	7·5	8·0	7·4	6·5	6·7	7·0	9·5	8·6	8·7	7·8
Least diurnal range	0·5	0·5	1·0	0·5	1·5	0·5	2·6	0·8	2·8	0·5	0·5	5·3	1·4
Mean at 9½ A.M.	80·8	80·0	80·1	79·8	77·3	73·5	71·9	71·4	73·0	76·2	79·2	81·9	77·3
Mean at 3½ P.M.	84·7	81·6	81·9	81·6	78·7	74·6	76·6	72·9	74·9	77·7	80·8	83·1	78·6
TEMPERATURE OF EVAPORATION. (Wet bulb Thermometer.)													
Highest temperature in the month ..	79·5	78·0	78·5	79·0	74·6	74·5	68·6	70·9	69·9	74·0	77·2	78·0	75·2
Lowest temperature in the month ..	70·5	71·4	69·1	67·2	66·1	59·6	59·5	60·0	59·0	62·1	62·1	69·1	64·0
Range in the month	7·0	6·6	9·4	11·8	8·5	14·9	8·9	10·9	10·9	11·9	15·1	8·9	10·4
Mean highest temperature during day ..	76·2	75·3	74·3	73·6	71·4	67·2	65·8	66·1	66·1	69·6	72·9	76·0	71·1
Mean lowest temperature during night ..	73·1	72·1	71·4	70·3	68·1	71·1	62·3	63·0	62·3	66·2	69·1	72·4	68·4
Mean at 9½ A.M.	75·8	74·3	73·3	72·8	70·7	65·9	64·5	65·1	64·6	68·5	71·6	74·7	70·2
Mean at 3½ P.M.	76·2	74·8	73·8	73·1	70·9	66·1	65·0	65·6	65·6	69·1	72·3	74·8	70·6
Approximate mean of month	75·4	76·1	73·1	72·5	70·3	65·6	64·5	65·0	64·7	68·4	**71·4**	**74·3**	**69·9**

METEOROLOGICAL TABLE—(*continued*).

Observations.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Average for the Year.
DEDUCED TEMPERATURE OF DEW POINT.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.
Mean at 9½ A.M.	71·7	71·4	70·0	69·3	67·6	62·3	60·9	62·0	60·6	64·6	67·9	71·1	66·6
Mean at 3½ P.M.	71·9	71·4	69·8	68·9	67·2	61·9	60·9	65·7	61·0	64·8	68·3	70·6	66·8
Approximate mean of month	71·8	71·2	69·8	69·1	67·1	61·8	60·8	61·8	60·7	64·8	68·1	70·8	66·4
ELASTIC FORCE OF VAPOUR.													
Mean at 9½ A.M.	·770	·763	·728	·714	·673	·566	·541	·560	·535	·611	·684	·755	·658
Mean at 3½ P.M.	·776	·762	·723	·703	·664	·561	·540	·563	·542	·614	·692	·745	·687
Approximate mean of month	·770	·757	·725	·708	·663	·559	·540	·557	·536	·613	·687	·748	·655
DEGREE OF HUMIDITY. (Complete saturation = 100.)													
Mean at 9½ A.M.	·682	·764	·728	·717	·731	·696	·700	·735	·667	·686	·699	·711	·709
Mean at 3½ P.M.	·669	·729	·681	·667	·691	·664	·659	·704	·635	·659	·680	·675	·676
Approximate mean of the month.. ..	·704	·762	·731	·724	·735	·696	·699	·734	·677	·697	·723	·718	·716
TERRESTRIAL RADIATION.													
Highest readings of Solar	112·5	114·0	106·0	108·5	107·0	97·0	96·0	98·0	102·0	110·0	110·0	111·0	106·0
CLOUD.													
Mean amount of cloud at 9½ A.M... ..	0·70	0·80	0·60	0·60	0·61	0·51	0·52	0·50	0·50	0·52	0·50	0·50	0·57
Mean amount of cloud at 3½ P.M.. ..	0·76	0·81	0·60	0·60	0·70	0·53	0·50	0·54	0·51	0·50	0·60	0·60	0·60
RAIN.													
Fall of rain in the month	5·366	46·51	2·475	3·224	3·727	0·029	0·450	0·590	0·00	0·25	2·15	2·039	5·55
Number of days on which rain fell ..	12	13	13	11	15	7	7	11	0	1	13	13	9·6

REMARKS.—Height of instruments above the sea level 30 feet.

The readings of the barometer have been reduced and corrected at 32° Fahrenheit.

The mean height of the barometer for the year is 30·00 inches.

The mean temperature of the air for the year, as deduced from four daily observations, is 76·87.

The mean temperature of evaporation for the year is 69·95.

Black bulb thermometer, exposed to sun's rays.

The amount of cloud is expressed decimally, unity (1) being taken to denote an overcast sky.

The fall of rain is expressed in inches.

WIND.—Number of times it blew from—

Direction of Wind.	January.		February.		March.		April.		May.		June.		July.		August.		Sept.		October.		Nov.		Dec.		For the year.	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
North	1	..	..	..	..	3	1	3	1	1	1	..	1	..	..	1	..	..	2	1	4	3	2	5	13	17
North-north-east .	1	1	..	1	1	2	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	..	..	3	6
North-east	1	2	..	3	..	..	1	..	1	1	..	..	1	..	1	1	..	..	1	1	..	..	3	2	9	10
East-north-east ..	..	2	2	3	6	3	7	3	8	4	2	1	..	1	..	..	3	1	0	2	..	..	..	..	28	20
East	11	6	7	2	9	7	10	10	9	11	8	7	18	16	21	19	13	8	19	15	17	12	16	14	158	127
East-south-east ..	3	4	4	2	5	6	4	4	1	5	5	4	3	4	3	3	4	8	2	1	..	1	..	..	34	42
South-east	1	..	6	4	5	3	2	1	3	2	9	11	6	8	6	7	6	6	3	1	1	1	..	..	48	46
South-south-east..	..	..	2	3	..	2	1	..	1	1	1	3	1	..	..	..	..	..	1	..	1	..	..	..	8	9
South	1	..	1	1	..	1	..	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	4
South-south-west .	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	3
South-west	1	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	1	..	..	3	3
West-south-west..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	2	2
West	3	1	1	3	2	1	..	..	1	2	1	2	..	..	..	..	1	5	2	4	1	2	3	1	15	21
West-north-west .	1	..	2	1	..	1	..	1	..	..	..	1	..	..	..	..	..	..	..	1	..	3	1	..	4	8
North-west	..	..	1	1	2	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	..	1	1	2	5	6
North-north-west .	..	1	1	1	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	2	1	1	1	..	6	5
Mean force =	0·61	0·46	3·0	4·0	1·70	1·54	0·59	0·43	0·15	0·22	0·63	0·70	0·55	0·48	0·70	0·67	0·29	0·28	0·22	0·26	0·37	0·32	0·21	0·12	0·76	0·79

The mean force of the wind from February to end of year is derived from the estimated force, the anemometer having been blown down in the February hurricane.

CEYLON.

The principal Medical Officer, Dr. Dane, Deputy-Inspector-General, reports the mortality to have been comparatively small for a tropical climate, and indicates, with reference to the previous twenty years, that the troops enjoyed a large immunity from cases of serious illness during 1861; yet he observes that the short period of a twelvemonth is not to be accepted as an index to the real character of the climate in regard to the health of either the European or native soldier—the fact being well known that such periods of comparative freedom from sickness are not unfrequently followed by the very opposite condition. Dr. Dane has been enabled to add that, among both civil and military residents, the type of disease was much milder than had been experienced for some years past, and that although, no doubt, much of this fortunate condition was owing to the removal of rank vegetation and opening-up of the island for the cultivation of coffee in the course of late years, yet he attributes much of this favourable state of things, as far as the soldier is concerned, to improved hygienic arrangements, more especially in regard to his rations and the larger amount of cubic space now available for his accommodation through the reduction of the military establishment, two regiments and a company of artillery now occupying the barracks which, in olden time, formed the residence of five corps, with a large proportion of artillery. Much more, however, remained to be carried out in sanitary respects throughout the Command, and as questions of colonial finance.

With respect to the canal in Colombo Fort, the Deputy-Inspector-General represents the foul condition in which it had continued to exist, and, as he adds, is likely to do so until some compelling proof of sickness, directly arising from it, shall urge the colonial authorities to sacrifice whatever financial opposition there may be in the case to the sanitary representations which have been made on the subject. The entire drainage of the fort is represented to have been in a sadly defective condition and doubts are expressed as to the possibility of its complete remedy. On urgent representation by Dr. Dane, the canal was eventually cleaned out; but he considered this proceeding as only a half-measure, and regrets that the recommendation of a mixed Civil and Military Board, to have it covered over, was opposed by the interests of some mercantile firms, who appear strangely to have vested rights or interests within the fort.

After repeated representations, similarly made, as to the insufficient and unsuited accommodation for married soldiers in the same fort, the local government was induced, within the last two months of the year, to grant funds for the building of appropriate quarters for this class.

In regard to the latrines throughout the Command, improvements were much needed, none being on a system up to the advance of the age. Cesspools were still universal; they had been specially reported on, and a better state of things was hoped for.

The leaky state of the roofs of the barracks at Trincomalee formed the subject of special representation, and repairs became effected. Dilapidated conditions of the military buildings elsewhere were brought under notice, and at Newera, Ellia, the Hill Sanatarium, improvements were made and others undertaken. A new hospital here was advancing rapidly in its erection.

The accommodation for the sick of the native troops at Trincomalee had been most defective, but due representation led to an order of the Colonial Government for the building of a new and commodious hospital. The circumstances of the hospital for the European soldiers at this outpost were improved in many sanitary respects, light and ventilation more essentially, at the suggestions of the Deputy-Inspector-General.

The water-supply for the troops was usually good, and generally so at the various military posts; but the means of ablution were still, at most stations, very meagre and incommodious.

The rations are reported to have been as good as circumstances would

admit of; but the dearth of potatoes, onions, and vegetables of this class, is much felt at the coast stations. Dr. Dane is decidedly of opinion that no reason exists why an adequate garden should not be established at the Hill Sanatarium. It would afford salubrious exercise for convalescent men, as well as an amusement for them. With the aid of a fewlabourers it should supply vegetables for the troops at the stations on the coast. He found it necessary, on observing a scorbatic tendency among the military prisoners, to recommend an increase of the vegetable element in their dietary. A new plan of dieting the unmarried native soldier was brought into operation lately. It was much wanted, as many of these men did not consume a sufficient quantity of nutritious food to enable them to perform their active duties efficiently. In regard to the cookhouses, attention had been frequently drawn to their defects; but hitherto such had not been remedied in any general or material respect.

Adverting to the canteen supplies, the principal Medical Officer expresses his opinion that the use of malt liquor should be placed within reach of the soldiers to a greater extent, and there would appear no reason why the troops atCeylon should not have equal advantage with those in India in this respect.

In regard to the military duties in this colony, Dr. Dane drew attention to the limited number of nights in bed for the men at some stations; and, although no positive illness appeared to have resulted in these instances, he gave his opinion that no soldier in this climate, in ordinary times, should ever have fewer than six nights a week off guard duty.

Measures were undertaken for the introduction of the new established lighter costume for the troops. It came to be highly approved of in wear for the hot and dry weather, being admirably suited; and rigid attention was given to the changing the dress of the men on guard by night and in wet weather. The dress of the native soldiers (Ceylon Rifles) required, it was conceived, an amendment to conform it more to native character.

It is reported that the want of amusement and the absence of gymnasia, to enable the soldier to relieve the tedium of a sojourn in the tropics, was greatly felt in this Command; but a move in a right direction appears to have been made at last. A soldier's institute, with a reading-room, one for games, bagatelle, backgammon, &c., had been established at Colombo Fort for the garrison; and to this a gymnasium is attached, with ground for quoits, &c. To this institute the soldier himself willingly contributes a small monthly sum for the advantages conferred on him, but the chief maintenance of the establishment is through the donations of the officers. The question of its support should not be thus wholly left; but Government aid should be contributed also, to secure its enduring success—an object of the highest hygienic import.

THE AUSTRALIAN COLONIES.

New Zealand.

Mr. Mouat, C.B., V.C., Deputy Inspector-General of Hospitals, in his Report for the year under review, writes as follows with reference to the climate of New Zealand and other conditions bearing on the health of the troops there:—

"The climate of New Zealand in general, and of Auckland in particular, has been stated to be greatly over-rated, from nearly all the published works being written for a special purpose, giving too partial an account of the climate of the different settlements, each appearing anxious to extol the particular province: hence the glowing descriptions.

"Auckland, the head-quarters of the Command, situated in latitude 36° 51′ south, and longitude 174° 45′ east, is probably the worst in point of climate, possessing a warmer and more relaxing atmosphère, which is described in books as being 'mild and genial;' but the warm weather is decidedly more unpleasantly warm, and the cool weather less bracing, than in most other parts

of the island, while in point of moisture it is quite as damp as any part of the country; therefore many of the descriptions which have been applied to it are not strictly correct. I cannot give a better idea of its semi-tropical, yet temperate climate, than by stating that it has the power of maturating maize and potatoes equally well, and that the vine grows, but cannot be said to flourish. The extremes of temperature are not so great as in most other climates. The seasons succeed each other in almost inappreciable gradation. Both the air and climate are favourable to exotic vegetation of very different zones.

"The quantity of rain in the year 1861 was 57·08 inches, being nearly 30 per cent above the average for a series of years, and exceeded that for the year 1860 by about 10 per cent.

"The greatest quantity of rain in 24 hours was 3·92 inches, which fell on the 23rd June.

"Atmospheric disturbances by storms were less than the average.

"The range of the barometer in the year was from 29·235 the minimum, to 30·439 the maximum.

"The mean temperature of the air was about a degree above the average, being at 3.30 p.m. 65° 4′, the mean minimum and maximum ranging between 55° 8′ and 70° 7′.

"With regard to the effects of the climate of New Zealand on disease, it does not seem to arrest consumption when fully developed, and, from its cold, wet, and variable nature, perhaps frequently induces this affection where the predisposition exists. It is, however, probably better fitted for pectoral complaints than many European climates which possess some reputation in this respect, and, on the whole, better adapted to the habits and constitution of natives of Great Britain than any of the Australian Colonies; and its effects in restoring the healthy aspect of the two regiments, recently arrived from India, speaks well in favour of its probably beneficial influence on invalids from the tropics. The space of latitude over which New Zealand extends causes considerable variety in the soil and climate, and which latter is further influenced by high winds and rain. Hail storms are frequent, fogs are rare, and snow is seldom seen near the sea coast; but the higher mountains of Tongariro and Mount Egmont, at Taranaki, are snow-capped all the year round. The only portion of New Zealand, besides this province, Auckland, of which I have any personal knowledge, is Taranaki, the seat of the late war. This latter district is situated on the west coast of the Northern Island, in latitude 39° 1′ south, longitude 174° 15′ east, being 120 miles from Auckland, and about 1,400 from Australia. Rather more rain falls in Taranaki than in Auckland. The climate, according to the evidence of Dr. Wilson, R.N., Colonial Surgeon, who has resided there ten years, is benign and temperate, whether with reference to the summer heat or winter cold, and is not very remarkable for sudden vicissitudes. The highest observed temperature in the sun was 124°, the lowest 88°, and the lowest in the shade 33°. Slight shocks of earthquake have been repeatedly felt: one or two occurred while I was there. The south-west and westerly winds are the most frequent, the south winds are the coldest, the north the most humid. The whole physical aspect of the country bears marked evidence of having been the result of former volcanic convulsions. Conical hills are seen, ravines, and small valleys, with here and there a level plateau, and the unmistakeable volcanic Mount Egmont in the back-ground, 8,800 feet high, looking as if ready to burst out at a moment's notice. Swamps and marshes abound in the district; but the New Zealand swamp, like the Australian, does not appear to cause injurious miasmata. All the islands are of undoubted volcanic origin, an agency which is still going on in some portions of this island; and earthquakes are not uncommon at Wellington, which has been twice desolated since it was colonised, being surrounded by high mountains, and subject to frequent and lasting storms. The climate, however, is said to be finer and more bracing than that of Auckland.

"Wanganui, where there is a large military detachment, is one of the out-settlements of Wellington. It enjoys a somewhat similar climate, and is within reach of the influence of the earthquakes.

"The only other station in the North Island occupied by troops is Napier,

the capital of the new province of Hawke's Bay. The climate is reported to be good, but earthquakes are felt there also.

"As climate, hygienic condition of barracks and hospitals, means of ablution, the nature of the duties, and intemperance, constitute the chief references to disease, I shall proceed to consider briefly how far the health of the troops may have been influenced by any of the above conditions.

"First, with regard to climate, and its practical effect on the Saxon race, it is quite true that the statistics of disease show a smaller amount, both of sickness and mortality, than in England; and the late Dr. Thompson, in his valuable work on New Zealand, institutes a comparison between the mortality of troops quartered in England and New Zealand, greatly in favour of the latter. This comparison was made, however, before the improved hygienic condition of the barracks, &c., at home, which has so much reduced the difference. Nevertheless, if it is to be inferred from the statistics in favour of New Zealand that it is more suited to Englishmen or the Saxon race than their own climate, it will be found a fallacy. Statistics made in the infancy of a colony are not reliable, chiefly on account of the absence of epidemic disease, which does not at first appear in a new country. The true test will be found in the deterioration or otherwise of the race, and this has yet to be proved; but, judging from the analogy both of the Australian Colonies and America, the race does not improve by being transplanted, and, unless frequently renewed by fresh blood from the mother country, will fast degenerate. I quite agree with Colonel Chesney, that most Englishmen will find the climate of New Zealand more enervating than they supposed, and less suited to their constitution than the more bracing air of their native land, always excepting invalids with a tendency to pulmonary complaints, who cannot bear the cold of an English winter. I would likewise except tropical invalids, and men who have suffered from the exhausting and enervating effects of an Indian service. The marked improvement in the health of the 57th and 70th Regiments, lately arrived, speaks much in favour of the climate of New Zealand in this respect.

"I should think the climate is well suited to benefit sufferers from the enervating effects of a tropical residence, and those labouring under functional derangement, without organic lesion of the liver, stomach, or bowels; also those who have suffered from fevers of an intermittent or remittent type, uncomplicated with local disease, such affections being almost unknown in the colony.

"Diseases of the lungs, being of sufficiently frequent occurrence, where at all developed, or where strong predisposition to phthisis exists, are not likely to be much benefitted; and I am perfectly satisfied that this climate is not adapted to invalids who have a tendency to affections of the brain or circulatory system.

"Cholera and small pox, have been unknown. Rheumatism is common enough, and, latterly, fever of a typhoid type, diphtheria, measles, and hooping cough are becoming at times prevalent. Both typhus fever and diphtheria prevailed epidemically amongst the civil population at Taranaki shortly after the termination of the war, with considerable mortality, owing to the neglect of proper hygienic precautions in the crowded state of the town, although urgently pressed on the attention of the civil authorities, both by the Colonial Surgeon (a retired naval medical officer) and myself. The troops occupying the same town, on the contrary, from the careful observation of sanitary rules, had not a single case of either disease.

"*Invalids.*—The number of military invalids who left this country during the year was 103, which is only 2·1 per cent. of the average strength; but, as a large proportion were men wounded during the recent war, and I do not know what number will be finally discharged, I cannot exactly state the results. The disabilities for which the men were invalided will be found in the Sanitary Report, a tabular abstract of which is appended.

"*Sanitary Condition of Barracks.*—In conclusion, I have reported elsewhere, specially, the many sanitary defects existing in the barracks and hospitals in this Command, as well as the want of more extended means of personal ablution, in which the different barracks and hospitals are singularly deficient.

"*Intemperance.*—Intemperance, and the use of unwholesome liquors, viz., colonial beer, and the whole host of deleterious compounds exported to a colonial market, but which, in the absence of canteens, generally, cannot be effectually prevented, must prove both a direct and indirect exciting cause of disease

among the troops. There is no doubt many lives might be saved, were it possible to restrain this abominable vice. The military authorities do all in their power, but the real evil lies in the licensing system, and the want of a proper sanitary police to prevent the sale of bad liquors. No less than twenty-five sudden deaths (out of hospital) have occurred during the year, a large proportion of which were due to intoxication. Deaths from drowning have been so common as to lead to the necessity of great precautions in bathing in any of the tidal rivers.

"The health of the force has been undoubtedly somewhat affected by the exceptional circumstances of war, and their prolonged stay under canvas during an unusually wet and tempestuous winter. This was quite unavoidable from the sudden influx of a large force in anticipation of a continuance of war, and for whom no barrack accommodation existed at the time.

"No epidemic form of disease, however, occurred, and the only zymotic disease that could be said to have prevailed was ophthalmia in some regiments, in its usual troublesome form. To this subject I have directed the special attention of medical officers, and have given instructions, both regarding the treatment in the early or vesicular stage, before granulations have formed, and the prophylatic measures to be adopted, and also as to providing special separate means of personal ablution for all so affected.

"Notwithstanding the drawbacks I have alluded to, and the acknowledged irregularities of the British soldier, the regiments quartered in New Zealand have enjoyed a high degree of health, as shown in the ratio per thousand of men who died in hospital from disease and wounds in action, viz., 8·58 ; but the salubrity of the climate, and the question of expense, which have hitherto been put forward as the excuse, I trust will not be allowed to operate against the introduction of the same extended barrack and hospital accommodation, means of cooking, and personal ablution, which have added so much to the health and comfort of the troops elsewhere, and would, no doubt, tend to a further diminution of mortality here.

"General Sanitary Return of Non-Commissioned Officers and Men invalided, and of Officers who have obtained sick leave, of the Troops serving in the colony of New Zealand, from 1st January to 31st December, 1861 :—

Disease for which Invalided, or obtained Sick Leave.	Non-commissioned Officers and Privates.	Officers.
Dysentery	2	1
Ophthalmia	3	..
Rheumatism	31	1
Strictura Urethræ	1	..
Phthisis Pulmonalis	10	..
Paralysis	3	..
Dementia	1	..
Amentia	2	..
Epilepsia	1	..
Dysecœa	2	..
Dyspnœa	1	..
Scrofula	1	..
Hypertrophia Cordis	3	..
Morbus Cordis	2	..
Varix	1	..
Bronchitis	2	..
Asthma	..	1
Hepatitis	..	1
Hamorrhois	1	..
Varicocele	1	..
Eczema	1	..
Ulcers	3	..
Fractura	1	..
Vulnus Sclopetarium	30	1
Total	103	5

"J. MOUAT, *Deputy Inspector-General, Principal Medical Officer.*"

Looking over the Monthly Sanitary Reports, it has been an uninterrupted satisfaction to find that the health of the troops in the Command continued most favourable, notwithstanding, as Mr. Mouat observes, the exceptional circumstances of war, and that a large portion of the force was under canvas for some time; two regiments also had joined from recent Indian service, and whose sanitary condition might well be expected, at first, to have presented the wear and tear of a tropical climate.

It is represented that many sanitary requirements in this Command stand over for want of colonial funds to meet the welfare of the troops. A want of special means of ablution at nearly all the out-stations continues to be referred to, and to this circumstance the Deputy Inspector-General attributes the constant prevalence of ophthalmia among the troops, an affection it has hitherto been found almost impossible to eradicate in consequence. No ovens have yet been provided at many of the stations, or any means of varying the cooking for the men.

At *Auckland*, the water supply to the Albert Barracks continues to be of questionable sufficiency for the summer months should a season of drought prevail; an element so necessary for the health, comfort, and cleanliness of congregated troops should be secured against possibility of failure.

At *Wanganui*, the water for the troops has still to be carried up the hill to the military position by fatigue parties of the men, a laborious and burdensome arrangement, which surely should be cancelled for other contrivance which engineering skill could apply.

At *Taranaki*, a colder climate than Auckland, the barrack-rooms are without fire-places, and the want is represented to be much felt in damp and cold weather. Temporary huts at this station required improved ventilation.

The erection of a special military prison at Auckland continued a great desideratum, more particularly demanded on account of the increased force collected through the circumstance of the war.

At *Otahuhu*, a new military post, the troops were, in the first instance, under canvas, and subsequently hutted.

Certain improvements in the hospital at Auckland were greatly required, and had been repeatedly represented.

The foregoing category of sanitary arrears and deficiencies, subtracting so much from the soldiers' well-being in this Command, had been forcibly and repeatedly brought under notice by Principal Medical Officers, but only to meet with postponement, and a reason in the want of colonial funds for the range of services, the high price of labour raising the estimate for the most ordinary work to a serious amount.

Australia.

In this, a distinct Command from that of New Zealand, the Principal Medical Officer, Surgeon-Major Sall, observes that, from so small an amount of disease as occurred, he had been unable, and fortunately, to trace any special causes which could have exercised a prejudicial influence on the health of the men. No epidemic visitation had presented itself at any station, and the sanitary security of the troops was studied with successful result, considering that not a few and long-existing hygienic defects had to be contended with.

At *Melbourne*, the ill-chosen site of the barracks is ever reverted to, and the case is one of regret that the mistake is not now likely to be remedied, from the circumstance that so much money has been expended. The General Officer in command, however, has stated, for the information of the Minister for War, that improvements were being made in these barracks, which he hoped would, by the end of the year, be in an advanced state. The intended new hospital, on a preferable site, had not been yet commenced. The site was selected in 1860, by Deputy Inspector-General Mr. Mouat, C.B.; and, on a suggestion by Surgeon-Major Mr. Sall, the Director-General has recently represented to the home authorities that, as the occasion of constructing the new hospital would afford a good opportunity for providing married soldiers' quarters, by a conversion of the present hospital for that purpose, the proposal

might be advantageously entertained, adding, that the provision of a new military hospital at Melbourne is of paramount necessity, as the position of the present one is most objectionable for its purpose, standing, as it does, in close proximity to a morass.

At *Sydney*, the drainage of the barracks had remained very defective, and had been repeatedly so represented; it was reported, however, ultimately to have met with considerable improvement. Objections were raised here as to the use of New Zealand flax for the bed-ticks of the men, the article being very liable to lump and harden; and hair mattresses were recommended for the hospital* more especially. For the latter purpose they were furnished eventually; and the Major-General commanding represented, with regard to the barracks, that as the flax had been substituted for straw as the means of bedding, at the recommendation of a board so far back as 1855, on account of the heavy expense attending the supply of the latter article, and, as the health of the men had apparently not been affected by the use of the flax, he had not directed it to be discontinued until informed whether the Imperial Government would sanction the expense which the Colonial would not willingly bear.

Some improved means of cooking were afforded the troops in the barracks of this station, enabling them to effect variety; but the means were yet partially supplied only, and were considered trial ones.

With reference to *Tasmania*, the Senior Medical Officer speaks favourably of the drainage where the military detachment is quartered; and adverts to the high rate of messing expenses the soldier has unavoidably to incur at this especial station, vegetables being scarce and dear, leaving him a very inconsiderable residue of his daily pay for other necessary purposes. Here very considerable improvements are represented to have been made in regard to ablution accommodation, and a building was advancing to completion, which was to serve the purpose of baths. Wash-house convenience for the women was provided.

CHINA.

After the active services of the war the European portion of the army left in the country, together with the ordinary garrison of Hong Kong, appears to have enjoyed a comparatively high state of general health during 1861; and the observations in the annual Sanitary Report by Dr. Currie, C.B., the Deputy-Inspector-General of Hospitals, tend, in concise manner, to state that those stationed in the south, alluding to Canton, Hong Kong, and on the peninsula of Kowloon (an experimental site of extemporized huts) had been so good during the year that no unusual causes of sickness or mortality could be said to have been in operation.

An equally good state of health was enjoyed by the small European detachment stationed at Shanghaie, occupying various public buildings appropriated for their accommodation; but the native troops of the Indian army were less fortunate here. These suffered severely from bowel affections, and, in the early part of the year, many deaths occurred among them. It is probable that the temperature at that season in this more northern locality may have been prejudicial, in this respect, to unaccustomed constitutions, as it is to be inferred that these troops were not otherwise than carefully provided for in the temporary quarters procurable for them. Dr. Currie assigns a further reason, however, for the sickness among these soldiers, in stating that the corps, before leaving India for China, had been very generally affected with intermittent fevers; and, moreover, that the water at Shanghaie, not purified by alum or means of filtration, appeared, in the first instance of use by these men, to have caused the complaints in question. On subsequent purification

* The hospital equipment throughout the Australian Colonies had been so defective as to lead the Director-General of the Army Medical Department, in the year previous to this under review, to advise the measure of sending out from England the articles laid down in the scale of the new Medical Regulations of the Army.

of the water, and in course of time, the affections ceased; and the Sepoys were latterly, as the European detachment, healthy.

Dr. Currie next gives a short topographical account of the station of Tientsin, which, during the year, was occupied by a force of 3,113 European troops and 291 Indian (native).

He represents it to be a town of considerable size in the province of Pecheli, in the north of China, in the latitude of 39° 5′ N. longitude 117° 10′ E. and situated on the right bank of the river Peiho, distant about 70 miles from Pekin and 30 from the Taku forts at the mouth of the river. He describes the climate to be one of extreme cold in winter and of highly tropical heat in summer. The highest point which the thermometer reached this year was 108° of Fahrenheit in the month of July, the lowest reading having been 1° in February; thus giving the wide range of 107° for the year, the mean temperature being about 54°.

Dr. Currie reports the British force of occupation at Tientsin to have been quartered in different parts of the town, and in the better class of Chinese houses, these being invariably one-storied buildings. Everything practicable is stated to have been arranged and done towards making the quarters comfortably warm for the winter-months and as cool as possible during the summer-season; but, under all circumstances, the accommodation could not but be of indifferent sanitary character for the necessities of European troops. Their clothing, however, was pronounced to be most suitable to the climate, and, in this respect, they were comfortably provided for. The rations supplied to them are reported to have been very good, and consisted of fresh meat and bread five days a-week, of salt meat and biscuit on the other two. Vegetables, fish, fowls, eggs, and game are stated to have been so abundant and cheap as to have been readily within the soldiers' means of purchase.

The most prevalent diseases among the European troops at Tientsin were fevers and bowel complaints; whilst sunstroke contributed, with them, to create the chief amount of the mortality, which reached a death-rate of 51·07 per 1,000 of strength, although the actual sick-rate was not, comparatively speaking, very excessive—1,416 per 1,000 for the year. The most prevalent instances of disease here appeared to be mainly due to climatic causes, the high temperatures of summer inducing fevers, bowel disease, and sunstroke, the intense winter cold proving deadly to men affected with chronic bowel ailment or other exhausting diseases. Dr. Currie has since found, however, advancing a reference to the conditions experienced in the second cold season (1861–2), that the effects of acclimatization had become very apparent then in the improved health of the troops.

Although the occupation of Tientsin by a British garrison was only a temporary political measure, a great deal appears to have been effected by the Royal Engineer Department in improving the state of the soldiers' quarters and their vicinities.

In the south of China, the garrison of Hong Kong, no important sanitary improvements were realised this year.

THE BOMBAY COMMAND.

Deputy Inspector-General Mr. Hadaway has attributed the chief sources of the admissions to hospital during the year to climatic causes, to the usual unavoidable exposure of the men on night guards or at stable duties of the cavalry, whilst syphilis and its allied affections contributed their generally large quota to the lists. As customarily, the greatest number of admissions occurred during the prevalence of and about the end of the South-west Monsoon, when fevers, catarrhs, and bowel affections are most numerous. In the cold season, when the wind was from the north and north-east, diarrhœa, dysenteric ailments, and hepatic affections were the more prominent; whilst, during the months of high thermometric range and accompanying hot winds, fevers and liver disease assumed numerical excess. Small-pox being found to prevail annually, more or less, in the months of February and March,

Mr. Hadaway reports that vaccination was fully carried out as a protective measure at every station and in each corps.

At *Nusseerabad* cholera visited, in July and August, the left wing of the 3rd Dragoon Guards and the head quarters of the 28th Foot. For it no special cause, or any beyond climatic ones, could be assigned; for, as Mr. Hadaway observes, no very marked sanitary defections existed at the station; and in the native bazaar, not far off from the position of the troops, populated as these places usually are, and indifferently drained, not a single case is reported to have occurred. At this time a good deal of diarrhœa prevailed among the men, and was attributed by the medical officers to the circumstance of their making use of deleterious native liquor. In regard to military hospital accommodation at this station, the Deputy-Inspector-General points out the necessity for great improvements for the circumstances of the Infantry corps whose sick had still to be accommodated in barrack rooms.

At *Asseerghur* ophthalmia, although of mild form and not traceable to any special local causes, was prevalent in the detachment of troops, the head-quarters of the same corps suffering similarly at Poona, the affection at neither place being prevalent among the natives. Suspicion appears to have been entertained of several men tampering with their eyes, and the case is reported to have been brought home to one of them, who became convicted of the act by a court-martial and met with punishment. Latterly the affection declined in the corps.

At *Mhow* better barrack accommodation was still much demanded for the Artillery and Cavalry, more particularly for the latter; and the whole three arms of the service were greatly in need of proper hospital accommodation—these points all pending financial power.

At *Neemuch*, also, new barracks for the Infantry were much required; and those of the Artillery, although not intrinsically bad in themselves, are much objected to on the question of site. The want of a new hospital for each corps is commented on.

At *Kirkee* only two at all satisfactory buildings to accommodate the Artillery portion of the troops exist, and new barracks are represented to be very necessary for this branch of the service here.

At *Colaba* two-storied barracks on a better site than the present are suggested as a desideratum. The hospital at this station is reported to have become much improved by having had proper roof-ventilation applied to it.

The foregoing are the stations more particularly alluded to in Mr. Hadaway's Sanitary Report of this year.

In regard to the general sanitary arrangements throughout the Command, he represents them as having been, on the whole, as satisfactorily carried out as circumstances admitted, many special measures for improvement, however, being unavoidably deferred on account of want of funds.

He refers to the Conservancy system—a most important ordinance in India—having been generally maintained in good working train at most stations, and to the prospect of its being improved at others where still defective.

The diet and supplies for the troops are reported to have been as generally good as the conditions at the several stations afforded: but it was thought improvement might be effected at certain seasons, when the quality of the meat is low and deteriorated, in supplementing dholl as a part of the ration—this article being comparatively rich in nitrogenous element. The growth of vegetables, it is stated, might be accomplished for the troops at many of the stations where, as yet, no effort in this direction has been established.

Mr. Hadaway concludes his Report with certain sanitary suggestions which his wide experience as an Inspecting Medical Officer in this Command enables him to put forth, and on the following points.

"The want of commodious day and reading rooms is much and generally felt, and these should be established at each barrack.

"The kitchens, generally, are so devoid of furniture, that the native cooks "cut up the meat on the floor. Tables and chopping-blocks should be supplied.

"Steps should be taken for the establishment of hospitals (Lock?) at "every native town in the neighbourhood of troops, venereal being a constant "and prolific source of numerous admissions amongst them to hospital, as well

"as an ultimate cause of undermining many constitutions and rendering the "men, in consequence, much more liable to the influences of malaria and "prevailing epidemics."

Mr. Hadaway objects to the present canteen system, and thinks it should give way to the establishment of a commodious coffee-room for each barrack, under rigid restriction as to the issues of spirituous liquors. He advocates the location of the troops, wherever practicable, at hill stations, and advises resort to sanataria over sea positions wherever available.

On the subject of the duties throughout the Command performed this year, and the appropriateness of the clothing of the European forces, he has reported favourably in each respect.

MADRAS.

[The Sanitary Review of the several Military Stations in the Madras Presidency, occupied by European troops in 1861, as given by Dr. Beatson, Deputy Inspector-General, may most satisfactorily be published in its own fulness of specialties.]

The accompanying Table will give some information on the subject of the relative sickness and mortality in this Presidency during the last four years :—

Year.	Strength.	Ratio per 1,000 of Mean Strength constantly Sick.	Ratio of Deaths per 1,000 of Mean Strength.	Ratio of Deaths per 1,000 of Sick Treated.	Remarks.
1858	10,593	81·38	44·56	23·84	
1859	12,627	67·87	11·80	15·45	For 9 months only.
1860	11,199	63·39	17·76	11·76	
1861	10,918	56·69	12·82	9·90	

On the whole the average number of sick and the mortality during 1861 are a considerable source of thankfulness, especially when we consider that during that year epidemic cholera made such ravages in the North-west Provinces and in the Punjaub ; and, moreover, that it was for a time prevailing to an alarming extent in the native town of Madras, while the regiment in the fort, the 43rd Light Infantry, was providentially saved from its ravages—no admission or death having occurred under this head among the men of the corps, and only one admission (not fatal) among the women and children.

At Bangalore, I regret to say, we enjoyed no such immunity ; there having been in the King's Dragoon Guards no fewer than thirty-six admissions and sixteen deaths from cholera, besides one death from the same disease among the officers, and three among the women and children of the regiment. The outbreak of the disease was here most unexpected, and it was even more difficult than it usually is to account satisfactorily for its appearance. The wing of this corps (the King's Dragoon Guards), which had just returned from China,—the men apparently in perfect health,—was encamped for some days on the Esplanade at Madras. During this period, I fear it must be confessed, there was very reckless exposure during the day, and not a little intemperance ; indeed, with men encamped on an open esplanade close to Black Town, it was impossible to prevent such irregularities, especially after long ship-board, and when the men had plenty of money, the result of long savings and of China loot. No sickness, however, occurred at Madras ; but, on the march up (the dismounted men were in transits), when near Kistnagherry, some forty-five miles from Bangalore and thirty-five from the railway station at Tripatore, the first case of cholera appeared in the second party (they marched up in four parties), and proved fatal after arrival at Bangalore. Another case occurred in the same party before their arrival, and two cases almost as soon as they reached this station.

This was the end of January. There was, at the time, no cholera prevailing on the road, and the season was as cool as at any time in the year ;

there had been no rain for some time before, and no reason to apprehend any epidemic influence. Dr. Jephson (King's Dragoon Guards) remarks that cholera is always lurking about the country through which these men marched. I would not quite say this. The old Madras road was in some places always very risky, if not unhealthy; but nearly all the low country is now traversed by rail, and from Tripatore to Bangalore is not considered an unhealthy road. The most unhealthy part is the immediate neighbourhood of Tripatore. I travelled myself up the same road, just in rear of the party attacked, arriving in Bangalore within twelve hours after them.

At the time the men of the China wing of this corps arrived at Bangalore the cantonment was reported to be, and I believe was, quite free from cholera; but once in the station, the disease did not entirely leave it until the Monsoon set in, and although at first it was confined to the men from China, in a short time it extended itself to the men of the right wing and to the women and children.

We will now examine the several Regimental Reports in detail, and, having myself now seen nearly all the stations, all except Tonghoo on the Burman frontier, I can pretty well point out what I consider the sanitary defects and requirements of each.

43*rd Light Infantry* (*Centre Division*).

The only British corps during 1861 at this station was the 43rd Light Infantry, and as regards the sanitary state of the corps there are some interesting facts in Dr. Barclay's Report (Surgeon of the Regiment).

First, as regards mortality. The 43rd Regiment arrived at Madras, on its return from active and severe field-service in Central India in March, 1860. During the remainder of 1860, the average number of sick was heavy, the men not having shaken off the malarious diathesis contracted at Nagode and other parts of Central India. During 1860, 995 cases of fever were admitted; but out of this large number there was no casualty, and no case of invaliding under the head of fever. At the end of the cool season of 1860-61 the health of the men had evidently so far improved that they had thrown off in a great degree the stated diathesis, and lost the malarious look, although they still appeared weakly and anæmic. However, great consideration was shown to the regiment in the way of avoidance of all long and severe parades, and as many as could be comfortably accommodated were kept at Palaveram, in the neighbourhood. By this latter arrangement, those in Fort St. George had much more barrack-space, and some objectionable rooms on the ground-floor were unoccupied. This latter circumstance, and the comparatively ample cubic space, together with the avoidance of any severe night duties, or long and fatiguing parades, did much to re-establish, comparatively, the health of this fine body of men; although to do so fully will, I believe, involve a total change of climate.

Under the circumstance above-mentioned, the results must, however, be considered as most satisfactory; the total deaths in hospital during the year having been five, and out of hospital one. The total deaths were thus only 5·338 per thousand of mean strength. Singular fortune!

Secondly, Dr. Barclay alludes to the question of the capabilities of the Fort St. George Barracks; and mentions that a committee ordered to consider, among other questions, that of the proper allotment for these barracks, had reported as a reasonable allotment 825 men. I was the medical member of that committee, and recorded my strong protest against the above number, and my decided opinion that the number of men in this barrack should never exceed 700; better still if the number can be kept at Dr. Barclay's estimate of 640.

The question regarding this Fort St. George Barrack can never be settled by any general estimate of cubic space. The plan of the barrack, as I have so often mentioned, is very bad; the rooms are double, the inner rooms looking into a long narrow area, through which there can never be free circulation of air; indeed, this desirable result could only be effectually secured by pulling down the ends of the parallelogram, and leaving the side buildings as two separate blocks.

In my remarks in last year's Sanitary Report, I alluded to the prospect of new married quarters being built at Madras. I believe it is still intended to renew the accommodation for the married soldiers and their families ; it cannot be done too soon, the present parcherry being a wretched, miserable, ill-ventilated, hot block of buildings, deficient in every necessary element and condition of comfort. I understand the money required is in this year's budget.

It is scarcely necessary to say anything here regarding the hospital accommodation for the European regiment in Fort St. George : everything that could be said against the now nearly completed arrangement was said both by myself and Dr. Barclay while there was still a chance of our opinions being of any avail. The expression of these opinions has been of no avail ; the blunder, in a sanitary point of view, has been nearly completed in all its original objectionableness, and, as if to set all sanitary considerations and recommendations at defiance, the college, which it was agreed should either be removed entirely or reduced to a minimum size as a surgeon's quarter, has been extended to a considerable degree lengthways, and this, too, since the hospital enlargement has been going on—indeed, simultaneously with it. By this extension of the college, which is right between the hospital and the sea, the north-east and easterly winds (the only healthy ones at Madras) are cut off from reaching the hospital ; while the only winds that can freely reach the building are the northerly and southerly ones. The former passes over the filthiest parts of an intensely filthy town ; the latter reaches the hospital loaded with the impure exhalations from the filthy stagnant backwater called a river, which is scarcely one hundred yards from the hospital. This lagoon is now the cesspool of a large portion of Madras, and is at times overpoweringly disgusting. Dr. Barclay mentions that among the patients in hospital, especially those in the wards running parallel to the Coom (the river so called), fever is frequently occurring, and that the only two cases of cholera, or choleraic diarrhœa, which took place in the regiment during the year, occurred in patients in these wards. These cases were returned as diarrhœa, but might with great justice have been so as Cholera.*

Since the foregoing remarks occurred to me, cholera, followed by fever, broke out in the 69th Regimental Hospital (a portion of the land or western side of the General Hospital) ; from the former disease, three deaths occurred—all in men long in hospital, and not under treatment for bowel complaints.

The sick had to be removed from the building for a time—a measure which I recommended, and which was at once acted on.

I would also beg to confirm Dr. Barclay's opinion regarding that disgraceful nuisance, the black-town drain—the main sewer of the native town of Madras, and its course trenching on the boundary of the Fort St. George. I have known it now for eleven years, and if there be any change it is simply that it is worse than it was eleven years ago in its exhalations.

The other drain, from the hospital privy, so long and so justly complained of by Dr. Barclay, and so long unattended to, has been lately closed, in consequence of a representation from me, through the Quarter-Master-General of the Army.

Water.—With regard to water-supply, Fort St. George stands almost unrivalled in this Presidency. The abundance of pure water for drinking and ablution purposes has, I feel certain, had no small share in improving the sanitary condition of the troops in the fort, compared with what it was in former years ; while, in such a climate, the unlimited bathing resources are an immense comfort to the men.

Intemperance.—As a cause of disease, Dr. Barclay remarks that the admissions indirectly caused by this vice were fewer than during the previous year,

* Dr. Beatson having early communicated to this Department a copy of his protest to the local authorities against the faulty site of, and the injudicious determination to magnify, as it must prove, the insanitary condition, by adding to the extent of a mixed Civil and Military General Hospital on such a site ; the Director-General further urged on the home authorities a representation of his strongly adverse opinion to the measure, recommending at the same time the selection of a distinct and suitable site for the erection of a purely military hospital.

although he acknowledges the difficulty of always arriving at just conclusions on this subject.

Exercises, &c.—From Dr. Barclay's report, it is to be gathered that there is considerable provision made for the mental and physical recreation of the men; and that the reading and games-room is supported by voluntary subscriptions from the men, and is well attended by them.

Prison Diet.—In my last Annual Sanitary Report the subject of prison diet was touched on, and a memorandum of an improved scale recommended by me was appended.

Poonamallee.

There is nothing specially requiring notice regarding this depôt, as no improvements but the most urgent could well be suggested, when it is proposed—indeed I believe I may say decided—to remove the depôt from this locality as soon as suitable buildings can be erected elsewhere. I understand the present proposal is to have the new depôt between the St. Thomas Mount and Palaveram, neighbouring on Madras.

I have, however, suggested in my Inspection Report, that as the facing of the Fort of Poonamalee has been removed, and the *débris* of the wall must sooner or later be taken away, it would be a great comfort to the sick in hospital if this were done at once; as the mass of old wall still standing all round makes the area of the fort very much hotter, and, if levelled, the material would fill in the dirty stagnant moat. One evil of this locality, which will be equally the case with the neighbourhood of the Mount, is the great facility for obtaining country intoxicating liquors. The whole neighbourhood is covered with palm-trees, cocoa-nut, palmyra, and areca (or betel nut) from the second of which especially the sap (known as toddy) is drawn, and converted into arrack, or drank in a half-fermented, and, of course, intoxicating state.

Water.—The supply of water at this station is abundant.

I quite concur in the remarks of Assistant-Surgeon Watts, under the head of "General Conclusions." The accommodation at the season when drafts of recruits or invalids are arriving at this depôt is not only utterly inadequate, but of the most inferior description: low, narrow, enclosed verandahs, converted into crowded dormitories, and the main rooms crowded and ill-ventilated; while such places as the guard and lock-up rooms are not fit for European soldiers in such an ardent climate as Poonamallee.

King's Dragoon Guards, Bangalore.

In the preceding remarks, I have mentioned the outbreak of cholera in this regiment, and that 16 deaths occurred under this head. But for the appearance and ravages of this epidemic, carrying off 1 officer, 16 men, 2 women, and 1 child, the sanitary state of the regiment would have been, during 1861, very satisfactory; only 6 other deaths having occurred in hospital, and 1 out of hospital. Among the former, 1 occurred from the effects of secondary syphilis, 2 from disease of heart, 2 from hepatitis acuta, and 1 from fracture of the spine, the result of accident; so that the deaths from zymotic or from climatic disease are (excepting cholera) reduced to 2, under the head of hepatitis. As regards the general health and physical efficiency of the men, they, as a body, look almost as well as if they were in England.

Seasons, 1861.—Dr. Jephson, Surgeon of the King's Dragoon Guards, remarks that the fall of rain in Bangalore, in 1861, was much below the average; but in comparing Tables for 25 years past, I find the fall in 1861 was 30·5 inches, which is not very much below the average, although much below the fall of some particular years, while it is above that of several others. The average for the last 15 years gives about 35·1 inches.

Barracks, &c.—The Dragoon Guards now occupy a set of good barracks above (*i. e.*, to the south of) the western end of Ulsoor Tank, with an open area of some extent on their north end, and with the horse lines between the barrack wall and the Ulsoor Tank. Her Majesty's 102nd occupy one block of the same barracks, and, as soon as the large and handsome barracks now advancing to completion on the old race-course are ready, the present ones will be con-

verted into Infantry Barracks, which will remove the horse lines out of the heart of the cantonment, and leave the space now occupied by them available for a soldiers' garden and recreation ground.

The barrack-rooms run north and south, are lofty, well ventilated, with double verandahs, and afford ample room.

Married Quarters.—At the western end of the present horse lines are the new married soldiers' quarters, forming at present three sides of a square, the eastern side being free. I trust it will be allowed to remain so, although I understand that by the plan it was contemplated to make a complete square. In this climate it is most desirable to leave one side perfectly open, and this can easily be done when the horse lines are removed; as, if additional accommodation is required, the two sides could be extended, so as to compensate for the loss of the fourth. By leaving the eastern side open, the view will embrace the Ulsoor Tank and the line of railway, and, with an aspect nearly north-east, will make all the buildings much cooler, as well as more cheerful. (Since this was written, I understand it is decided to extend the sides and leave the front open.) It is proposed to lay out the area as neat flower-gardens. These married quarters are exceedingly comfortable, and I have always observed them to be kept very clean.

Bath Rooms.—I think much more bath-room accommodation would be very desirable, as well as a much larger supply of water. There is no plunge-bath connected with any of the Bangalore barracks. I believe there is now a proposition to raise water (from the Ulsoor Tank) above the level of the barracks, by means of a steam-engine, into a reservoir placed on the top of the rock, which forms the centre of the bund of the Tank. If this can be done, of which I believe there is no doubt, and the water be conducted through some efficient filtering process, it would be of incalculable advantage. For the new Race-course Barracks some provision for water supply must soon be made, as the expense and labour of carrying water by puckallies from the Ulsoor Tank would, I have little doubt, eventuate in there being a very limited supply available for ablution purposes. The same remarks may be made regarding the married quarters above mentioned. Without some such provision (as that mentioned above) for a due supply of water, they will be badly off for this essential element.

Urinals, &c.—The favourable state of things mentioned by Dr. Jephson, as resulting from the putting down of stink-traps, has not continued during the hot weather (which set in subsequent to his writing his Sanitary Report), and he has more than once called my attention to the offensive odours in and around the urinals. Everything that could be done in the way of deodorising by charcoal hung up in wire cages has been done, but it is useless to hope that drainage will be free from offensiveness without ample means of flushing the drains. I therefore have little hopes of the evil being corrected until the urine is collected in vessels and removed nightly. Tubs coated with coal tar and with well-fitting covers would answer best.

The latrines also require considerable alteration and improvement. It has been suggested that the seats should have covers, and should slide out and in, as, when fixed, it is impossible to get them thoroughly cleansed and dried: if they can be removed, they are washed and dried in the sun in half-an-hour. All the tubs should be well coated with coal tar, and arrangements should exist for removing them by drawing them out from behind. Unfortunately, the backwall of the western latrines is on the public road—a great mistake in their first construction. There should also be two complete sets of tubs for every privy, so that no tub need be put back until it has been well cleaned.

Hospital.—The hospital has been lately entirely repaired, and it is to be regretted that a few thousand rupees more were not included in the estimate, so as to raise the floors of the wards, and especially of the verandahs, at least three feet more from the ground. At present the floor of some of the verandahs is level with, indeed almost below, the ground. No building should be so in this, or in any other country. If the floors had been raised, and there had been some windows, or glass-doors in addition to the Venetians, which come down to the floors, the building would be much more comfortable. Many of the appurtenances are very good, especially the kitchen and the privies. The bath-rooms are not so good as they should be; they are too

small, and not at all well ventilated; but they are quite capable of improvement in the latter respect. Although the kitchen itself is good, a suitable range is much required; and I understand will very soon be sanctioned. A well has been dug in the hospital-compound, and is duly protected by a strong grating.

The present Infantry Barracks at Bangalore are old, low in the roof, narrow, with only a verandah on one side; in fact, are most inferior in every way to the others. It is consequently often asked, Why is it that they are quite as healthy? as no doubt they have been. I cannot answer this; but I may say, that I do not think the present Dragoon Barracks are always as healthy as I conceive they might be and should be. Sporadic cases of cholera have been occurring this year also (1862), among the men of the King's Dragoon Guards. First, the close vicinity of the horse lines in the heart of the cantonment, and close to the barracks, *may have* some influence, although these lines are kept very clean, and I would not expect any unhealthiness from them. Secondly, the margins of the Ulsoor Tank *were* in a very offensive state; now, I hope, we may say that that evil is remedied. Thirdly, the whole barrack area is blocked up by a high wall, and on the south and south-west side by rows of married sergeants' quarters at right angle to, and within eighteen feet of, what is the windward side of the barracks during all the south-west Monsoon. The result is, that there is no free perflation of the upper part of the barrack enclosure. I consider the erection of these buildings to have been a great mistake. The second block has been recently erected (in 1861). I alluded to the great sanitary evil of the first block in my Sanitary Report for 1859. I look on the existence and position of these buildings as a far greater evil than the vicinity of the horse lines. Lastly, has the water used by the Fusiliers, occupying the Infantry Barrack, had its effect on the sanitary state of the regiment? Their drinking-water is obtained from a different and, it is generally considered, a better well, than the one which supplies the King's Dragoon Guards' Barracks.

Barrack Cells.—The solitary cells are very objectionable, and never used if it can be avoided.

Exercise and Recreation.—There are ample means for healthy exercise in a ball-court and skittle-alleys, and there is an excellent reading-room and regimental library.

60*th Rifles, Wellington* (*a Hill Station*).

There is little requiring remark regarding Wellington, except to observe that everything that can conduce to make men healthy and comfortable has now been done at that station. That the death-rate has been high cannot be questioned, and even in the return for 1861 there are twelve deaths from zymotic disease, including several fatal cases (three) of severe low fever. I am of the same opinion as Dr. Sparrow, Surgeon of the Battalion, that the sickness hitherto has been not a little influenced by the want of early and efficient drainage. The ground on which the barracks stand was in a measure, and certainly in part, made ground; the surface having been levelled, and the extent of level surface increased, by filling in on the sides. All this would render drainage the more necessary, as, the natural hard sloping surface of the hill being removed, the absorption of moisture would of course increase. Now that the drainage is complete, an opinion as to the real character of the climate will be more easily arrived at. I can see no reason why the place should not be healthy; but, as the south-west Monsoon does not reach Wellington, June, July, August, and September, are very warm months, and exposure out of doors must therefore be much more guarded against than is necessary under (during the above months) the generally cloudy skies of Ootacamund.

The accommodation at Wellington is of the best description: good two-storied, well-built barracks, which afford ample accommodation for a regiment of Infantry, and would accommodate even more than the present reduced establishment of a battalion, if the unfinished block were complete. The necessary appurtenances are all good and well arranged, and there is an ample, in fact unlimited, supply of water, giving the men abundant facilities for bathing and swimming in the splendid swimming-bath, which is completed, close to the barracks.

Dr. Sparrow alludes to a proposal to form a lake by damming up the Waterloo stream. I fancy this could be easily done, and a handsome, useful lake be the result.

Rations.—On the whole, the rations at Wellington are very good, and the men need only exert themselves a little to have an abundant supply of the finest vegetables, and fine healthy exercise to boot.

66th Regiment, Cannanore.

A perusal of the Annual Sanitary Report of Her Majesty's 66th Regiment for 1861 is very satisfactory, and would have been more so, but for an outbreak of cholera, in July and August last, which caused four out of the eight deaths which are recorded in the Return.

One death only occurred under the head of dysentery, a fact which speaks well for the hygienic conditions under which the men have been during the year.

The other 3 deaths were—1 phthisis pulmonalis, 1 disease of heart, and 1 inflammation of bladder, which, with 4 from cholera and 1 from dysentery, make the total number of 8.

Dr. Murray, Surgeon of the Corps, mentions that there is not always a sufficient supply of water for ablution purposes. This is from a deficiency of the means of bringing a sufficient quantity to the barracks, for the supply at the station is always ample.

The two requirements of Cannanore are new married quarters, so as to accommodate the married people in the lines, and to remove them from the objectionable locality of Burnacherry, where the cholera appeared last year. The removal of the families from their house, when the disease appeared in the greatest severity, to a bungalow on the cliff, stopped the disease among them. New married quarters are sanctioned, and will be commenced at the end of this Monsoon. The materials, I understand, are now being collected.

New solitary cells are also very much required, and I believe it is fully intended to meet this requirement also as soon as possible.

Although the death-rate and the sick-rate have both been low in the 66th, it must not be supposed that the men have not felt their nearly five years' residence in the relaxing climate of Cannanore, at which locality anything approaching to cold weather is unknown. When I saw the men in December 1860, they then showed an approximation to that bloodless, exhausted look which is so visible in men stationed for any time in the steamy heat of Colombo, in Ceylon; the climate and physical aspect of which very much resemble those of the western coast of Southern India. Men long in such climates as these, if called on for any hard work, are utterly unfit for it. I believe this was found to be the case with the 37th, when brought to Bengal from Ceylon in 1857. In 1847 that Regiment came to Ceylon in the highest state of health and efficiency. When reliefs can be effected, regiments should not be left on the western coast for more than three years.

74th Highlanders, Bellary.

The 74th Highlanders have been stationed at Bellary during the whole year, and generally the sanitary state of the regiment must be considered to have been good, considering the climate of Bellary, remarkable for its ardent, dry, persistent heat.

The total deaths in Hospital during 1861 have been 8: of these, 2 were fatal cases of cholera, 1 occurred from dysentery, 2 from fever (1 under the head of typhus), 1 from phthisis pulmonalis, 1 from a combination of hepatitis and bronchitis, and 1 under the head of hepatitis.

The other 2 deaths occurred out of hospital—1 from drowning and 1 from apoplexia.

Barracks.—These fine buildings have not been placed in the best locality They are situated on low ground, far too close to the large and very remarkable looking mountains of naked rock, on one of which is the Fort of Bellary. The present race-course would have been, in a sanitary point of view, a far preferable site, and would have afforded greater facilities for drainage, and been in a great degree free from the reflected heat of the mountains of rock.

These barracks require some more protection from the glare of the sun, and from the reflected heat from the ground. I have in my last Inspection Report alluded to this, and trust that it will be sanctioned. The ventilation, ground and otherwise, especially of the inner verandahs, might be improved.

The drainage is also a subject requiring speedy attention. At present the *fall* of the drains is not sufficient, and the surface drainage is most imperfect. Dr. Macbeth, Surgeon of the 74th, attributes the outbreak of cholera to the emanations from one of the drains. The Quarter-Master of the regiment, who superintended the examination and cleaning out of one of the most offensive, fell a victim in a few hours to a most virulent attack of cholera.

The lavatories also require improved drainage, and improved arrangements generally; and the urinals are most offensive—at least were so last November, and I have not heard of any material improvements having been completed.

One of the great evils which Bellary labours under is the precarious and scanty supply of water. If it be practicable to increase the supply, it certainly should be done, even if it does (as no doubt it must) involve considerable expense.

As regards the arrangements for the conservancy department of barracks and hospital, some improvements are called for; such as closed iron carts, and spare sets of tubs for the latrines. These requirements in the barrack latrines generally have been referred to in a previous part of this Report.

Rations.—On the whole, there seems little cause for complaint under this head, except the occasional inferiority and scarcity of potatoes.

Cells.—The cells are very bad, and new ones, on a totally different plan, are urgently called for. On my representation, orders were sent from Head-Quarters to have a thatched roof superadded. This was urgently necessary to moderate the fierce heat of the Bellary sun.

Hospital.—The new hospital has been occupied since September 1861. It has many defects, several of which are pointed out by Dr. Macbeth, and were also alluded to by me in my last Inspection Report (November 1861). The necessity for excluding the glare and heat which beat in through the lofty open corridors is urgent, as well as the necessity for providing suitable quarters for the subordinate Medical Officers and the Hospital Sergeant. I think it is also a decided mistake to have the female hospital in the same building: it involves shutting up one end of the building, which, in a climate like Bellary, should be avoided. A separate and moderately-sized detached building is far preferable.

When I visited the hospital at my last inspection, I was diappointed to see the bath-rooms, privies, &c., so imperfect in all their arrangements. One is prepared for such things in old buildings; but, in one just completed at great expense, I expected to see things in a different and better state.

Married Quarters.—New and very good married quarters have been lately built at Bellary, but they are seriously injured by the way they are clubbed together, and by being end on to the prevailing winds. There is ample space to have extended and spread them out, and I can conceive no reason why such should not have been done. The site is good, but the relative position of the buildings bad.

Secunderabad and Trimulgherry.

At this station, during 1861, there were (of British troops) two batteries (2nd and 8th) of the 13th Brigade of Royal Artillery, Her Majesty's 17th Lancers, the Royal Regiment, and the 18th Royal Irish Regiment.

We will notice the barracks and hospitals of each in rotation.

No. 2 Battery, 13th Brigade, occupies (1st January, 1862) three of the twelve blocks of barracks; of the remaining nine, eight are occupied by the Royals. No. 8 Battery occupies the new blocks more recently erected, in a northerly direction from the former ones and at a somewhat higher level. These new Artillery barracks are built like the more recent ones for the 18th Royal Irish, each for half a company, and have in the centre a day and dining room, and at each end sleeping accommodation for twenty-five men; so that each barrack is for the accommodation of fifty men, or half a company, with end rooms for sergeants. I consider the plan of these more recent barracks

to be excellent, that they afford the men every comfort, and go far to mitigate the heat and discomfort of the hot months at Secunderabad.

The health of the two batteries has been most satisfactory during 1861. In No. 2 there were 2 deaths from acute hepatitis, and 1 from disease of the heart. In No. 8 there was 1 death from phthisis at Poonamallee, and only 1 death during the year occurred in this battery at Trimulgherry; it occurred under the head of fistula in perineo.

As far as regards barracks, there is little to be desired; and if the rations were of somewhat better quality, and the vegetable element (especially potatoes) more abundant and regular, there would be nothing further to be desired as regards the men's food. But as long as men will indulge, as too many will, in the use, and often go to the abuse, of ardent spirits, there will be more sickness than would otherwise exist.

17*th Lancers.*

This regiment occupies, and has occupied since its arrival at Secunderabad, the old infantry barracks. These buildings were not in former days considered healthy, and in them (as I mentioned in my last year's Sanitary Report) the Royals suffered severely in 1858–59; but, by removing certain ranges which crowded up the area, removing also some offensive privies from the same locality, cutting down the barrack wall, and topping the lowered wall with a railing, greatly improving the drainage, and by the avoiding of all over-crowding, their sanitary state for two years, and especially during this year, has been very satisfactory. They are, however, badly situated barracks, and will always require the greatest observance of all sanitary precautions to keep them healthy. They have, however, one advantage (at present, at all events) over the new barracks at Trimulgherry, in being well and conveniently supplied with water.

1*st Royal Regiment.*

The Sanitary Report of this corps shows a very satisfactory condition of the regiment during 1861, and, the splendid barracks occupied by the regiment having been so frequently described, it is needless to again allude in detail to them in this Report. There are in all twelve blocks of these, as mentioned before: the Royals have eight; and, when the strength of regiments is brought down to the present established standard, nine blocks should afford ample accommodation for a battalion. Almost the only urgent matters now requiring attention in connection with the Trimulgherry cantonment are—1st, the providing not only an ample but a convenient supply of water; and, 2ndly, completing the drainage. An extensive scheme of drainage was proposed by a committee assembled about this time last year, or a little later: it was proposed to connect all the latrines with main drains, and by means of water to flush and carry off *everything*. The Supreme Government of India have very fortunately *vetoed* any such experiment. In the first place, the question of the amount of water really procurable has not been satisfactorily settled; it is said there is plenty of water, but it has not yet been produced. There is, fortunately, water enough for drinking and culinary purposes, but for several months the supply for ablution cannot be called plentiful. I am much more inclined to call the supply in March, April, May, and part of June, scanty. It would, for instance, be extremely desirable at such a station as Trimulgherry, and in such a climate as Secunderabad, to have several large plunge-baths for the men; but could they (or even one), with the present water supply, be filled regularly, except at an enormous expense and with great labour? The principle which the Supreme Government wisely insists must be observed in any drainage scheme for Trimulgherry is, that all the contents of latrines, of urinals, and all refuse and offal from kitchens and barrack-rooms, must be removed, and that the drainage will simply be to carry off surface water, and refuse water from bath-rooms and lavatories. This is, I believe, the most judicious arrangement in this country, and especially so at Trimulgherry, where there can be no command of *running* water in sufficient force and quantity to make sewerage safe and inoffensive. Hand-sewerage, as it is termed, is no doubt very repulsive; but it is effectual, and in this country I

believe it is the only safe plan; the ordure being carried away to a distance, at least two miles, and buried in trenches, each deposit being covered over by a layer of earth left after excavation for that purpose on the sides of the trench, or, better still, on one side only, leaving the other side free for the night-carts to come up and deposit their contents. When the trench is filled to within a foot or so of the surface, it should be completely covered in, and a new one commenced.

18th Royal Irish.

The Medical Officer in charge of the 18th Royal Irish, Assistant-Surgeon Ffolliott, attributes the high sick rate, and, relatively with other regiments at Secunderabad, the high death rate, to the inferiority of the barrack accommodation, to the objectionable material of the bedding, to the less healthy site of the temporary barracks, and the deficiency of sufficient vegetable and anti-scorbutic elements in the ration. I am inclined to endorse these causes, except one, viz., the less healthy character of the site of the temporary barracks. This site is a little lower than that of Trimulgherry, but nothing to speak of, and I see no reason why it should not be healthy. It is capable of perfect drainage—indeed, even the natural drainage is very good; there is nothing objectionable *now* in the soil, or immediate vicinity, as the rank vegetation and objectionable debris of the old native infantry lines have been removed. The water-supply is decidedly superior to that at Trimulgherry, and I feel sure that, with as good buildings on this site, it would prove just as healthy.

That the circumstances connected with this locality, for instance the inferior accommodation, were unfavourable, seems clear from the much larger proportion of sickness in the portion of the regiment that occupied it than in the companies at Trimulgherry. The total deaths in hospital amounted to 19, or nearly 2 per cent.: of these 19 deaths, more than one-half were from zymotic disease.

The sanitary state of the 18th Royal Irish during last year, although such a sick rate and death rate at Secunderabad in former years would have been thought remarkably low, cannot be considered to have been as good as it should have been; and, as the nature of the accommodation was decidedly inferior to what the other regiments enjoyed, it is clear that good barracks and plenty of room, with ample ventilation, are decidedly beneficial, and that, if such conditions (as no doubt they do) cost money, it is not money wasted; although I would venture to express an opinion that the same amount of health and comfort might be secured without going too far in the way of great architectural grandeur. In the case of these temporary barracks, a small additional sum spent on each room, so as to give glass windows, and venetian shutters, and some improved ventilation, would have rendered these buildings much more comfortable and much more healthy. It must, however, be remarked that they are by several feet too narrow, and, therefore, can never be really comfortable or convenient rooms. To have made them broader would have largely increased the expense, on account of the roofing that would have been required.

Hospital, Trimulgherry.

I have already described this hospital, and what I consider its chief defects. Ablution-rooms were much wanted, and are now being supplied; and the immense ward above, and the corresponding one below, are, at my recommendation, now being divided into four divisions each. The lower part is nearly finished, and is reported to me to be greatly improved; and I am informed that the low partitions will add considerably to the convenience of the accommodation. This hospital was planned for the sick of one regiment. When divided, I think it will hold, giving ample superficial and cubical space, the sick of the two infantry corps at Trimulgherry. There will be good accommodation in the main building for 144 sick.

Married Quarters have been lately built (during 1861) in connection with the new barracks, which are now occupied by the 18th Royal Irish. These barracks in themselves are good, and will be unobjectionable in every way when the drainage is completed, and an increased and more convenient water-supply can be afforded. There is one well (alluded to by Assistant-Surgeon

Pfolliott), which struck me when at Secunderabad, last December, as favourably situated for a good supply of water: it was then newly dug for the convenience of the contractor, but was to be reserved and regularly made for barrack purposes.

91st Regiment, Kamptee.

Since the completion of my Report for 1860, I have been enabled to visit this distant station, and to spend twelve days there, so as to see everything at Kamptee, and at the outpost of Seetabuldee, ten miles off.

The barracks at Kamptee, prior to the arrival of the 91st, had not been occupied by European troops for several years. Since the arrival of the corps, in the end of 1858, there have been many improvements effected, both in the barracks and hospital. The former have had ridge ventilation added, new ablution-rooms, means of recreation (physical and mental) for the men, such as a soldier's institute (regimental), in which the men have a reading-room, a games-room, a coffee-room, and a shop, in which the soldier can purchase everything he requires (of course no intoxicating drinks are sold), without going to the bazaar; a gymnasium, and skittle alleys.

The drainage of the barrack enclosure has been improved, but a much more extended and complete system is required to drain the swamp to windward of the barracks.

Latrines.—In my last Inspection Report, I alluded to the objections to the site of the barracks. That site cannot now be altered, so all that can be recommended is to correct the surrounding evils as much as possible. One great evil, certainly, is the present site and construction of the latrines. These buildings are much too near the barrack-rooms—they are to windward during the greater part of the year. They are most faulty and defective in construction, without seats and without tubs, so that the floors become inexpressibly filthy and disgusting. They require entire reconstruction, and to be placed either further from the barracks, or, better still, as far as regards sanitary considerations, in a different locality. A suitable one has been pointed out by Dr. Murphy, Surgeon of the Regiment, and alluded to by me in a letter of the 24th December, 1861, addressed to the Officer commanding Nagpore force. There are, however, great objections taken to moving these buildings to the eastern end of the barracks, although all are agreed that, in a sanitary point of view, as regards the barracks, the eastern end would be unquestionably the best site; but the evil might be thus transferred to many other buildings in the neighbourhood, and, as some of these buildings would, it is considered, be permanently injured, and therefore have to be paid for, the change of the latrines would involve very considerable expense. It is, therefore, proposed to build new latrines further from the western end of the barracks, and to have them on the most perfect construction. One or two are to be tried as an experiment, and, if found to answer, and to be free from offensiveness as regards the barrack-rooms, the new set will be completed. No reasonable objection can be taken to this experiment, and, if the present evil can be remedied by moderately increased distance and superior construction, the chief sanitary objection will be removed; but, if the latrines are at the western end, there should certainly be a second set of urinals—a double one between each two blocks of barracks—at the eastern end, as it is too far for a man located at the eastern end of the barracks to go every time he has necessity all the way to the urinals attached to the latrines at the western end.*

Married Quarters.—The married quarters which I saw at Kamptee were about as wretched as they well could be. New ones are being erected on a much better site. They were, indeed, urgently required.

Hospital.—The hospital is certainly at an inconvenient distance from barracks, and its situation is not a good one; but a great deal has been done to make it a very comfortable hospital, and, if the recent alterations going on when I was at Kamptee, make the roof water-tight, and a new latrine on a proper plan of construction be built, together with a new guard-room, and the

* I have pointed this out in a communication to the Quartermaster-General of the Army.

drainage be improved, there will not be much reason to complain of the hospital as a building.

I suggested some trees being planted between the hospital and the river, to form shady walks for the convalescents.

The solitary cells have had a thatched roof put over them, and their ventilation improved. If new ones are built, they will no doubt be on a much better plan.

Seetabuldee.

There is a small barrack at this outpost for about 50 men. The barrack is roomy and comfortable, but a new hospital would be a great advantage: it need not be large, and should be built on the hill. At present, chiefly on account of the inferior hospital accommodation at Seetabuldee, all sick that can bear the journey are sent into head-quarters, ten miles off. I had occasion to notice to the Station authorities at Kamptee the inferior and defective ablution accommodation which I found at Seetabuldee.

68th Light Infantry (British Burmah).

The sanitary state of Her Majesty's 68th Light Infantry has been, during 1861, remarkably good. The deaths, 11 in number, would be a very low death rate anywhere (9·99 per thousand), and, in a tropical climate, this is a most satisfactory one; that such a rate should continue, or be taken as an average one, would be too much to expect; but it is extremely satisfactory to record such a sanitary condition of a regiment in Burmah, the climate of which has been considered as necessarily so inimical to the European. I myself believe that it is not altogether unjustly considered so, for, although the effects of the climate are happily not shown or felt by troops in such barracks, and with all the care that is being properly taken to secure their health and comfort in the several cantonments, the climate of the country generally is a severe and treacherous one to Europeans exposing themselves to its full influences; but, indeed, the same may be truly said of an Indian climate generally, when Europeans are exposed to, and not protected from, its influences during the hot and wet months.

I have revisited Rangoon and Thayetmyo within the last few months, and was pleased to see the great comfort of the barracks, and at Rangoon the excellent site chosen. The barrack bungalows, &c., are erected on a high ridge, which, in 1852, was called "Pagoda Ridge," and on which, at that time, there was a row of pagodas, and a row of large phoongee houses: in the latter the 51st Light Infantry were quartered. My experience then led me to consider this locality the healthiest in the place: it is freely exposed to all the sea breezes, and commands an extensive and cheerful view of the sea, of the Pegu river, and of all the surrounding country. It certainly has maintained its character for salubrity, for no men serving, and having served for four years, in a tropical climate, could look more healthy than did the men of the 68th, when I saw them in February last. The same remarks will apply to the men of the three companies at Thayetmyo, where there are now excellent barracks on the same plan as those at Rangoon.

69th Regiment, Tonghoo.

The health of the men of the 69th, at Tonghoo, was not quite so satisfactory, although the death rate was not higher (9·12 per thousand) than that of the regiment on the Irrawaddy side. After the withdrawal of the detachment at Shoeygheen, the bad type of fever gradually disappeared. The 69th were relieved in January, and are now at head quarters at Fort St. George, Madras, and three companies at Wellington: at the latter station the men are, I understand, improving rapidly in appearance.

I much regret that my time did not permit my visiting Tonghoo this year: it is the only station occupied during the period of this Return by British troops, connected with the Presidency, which I have not seen; but it would have taken me six additional weeks, and, having been absent from my office five months, I found my going to Tonghoo quite impracticable.

I will now conclude this Report with a few observations on one or two general subjects embraced in the scope of a Sanitary Report.

Clothing.—The introduction of the loose red serge frock is, I believe, universally considered a very great improvement on the cloth tunic, which latter is scarcely bearable at any of the hotter stations in this Presidency. The serge frock is easy and light, and, being of woollen texture, protects men from the risk of sudden chills; in appearance it is acknowledged to be most becoming; the soldiers, however, still require a lighter texture of woollen trousers. Even at this comparatively cool station (Bangalore) white trousers are too often worn simply because the men have nothing intermediate between the heavy cloth and the calico trousers, and would therefore rather run the risk of the latter than endure the discomfort of the former. The summer trousers used at home, and in the Mediterranean, would be a great boon to men in India.

Bedding.—I entered very fully last year into this subject, in a Report called for by the authorities in Madras. No material change has yet taken place: the whole system requires to be changed. One uniform scale of bedding will not do in a Command in which there are such varieties and extremes of temperature. The bedding that is sufficient for men at Madras and Trichinopoly is not sufficient for men at Bangalore, Wellington, or, during the cold months, at Secunderabad and Kamptee. The barracks at each station should be furnished according to the necessities of its climate, and the men should only individually possess each a good blanket. Special arrangements would, of course, be made for the occasion of troops marching, and, at the end of the march, the men would find (if the British system were adopted) clean and comfortable bedding provided for them in the barrack allotted for their reception.

Limewashing Barracks.—The General Orders of the Command allow whitewashing only once a-year. Her Majesty's regulations very properly specify that it is to be done twice; but, to get it done twice in this country involves special requisitions and considerable delay. It is simply necessary for the Indian Government to notify that Her Majesty's regulations on this subject are to be complied with, and all difficulty is at an end. Once a-year is not sufficient.

Kitchen Ranges.—I hope before another year to be able to report that efficient ranges have been put in nearly all the European barracks. A very good range has been planned by Dr. Duff, of the Madras Army, which I believe Government are most anxious to introduce into all the barracks and hospitals. The saving of fuel in these ranges in a year will repay their expense, while their advantages in other respects are incalculable.

Rations.—On the whole the quality of the rations seems to have been pretty good—the bread is generally acknowledged to have been so—but occasionally at this station (Bangalore) it has been condemned; and, to meet such a case, and avoid all delay in procuring better, it has been proposed to keep a supply of good buscuit in store. This, I think, should be done; and, to prevent deterioration, it could be issued once a fortnight. In the event of a moveable column being suddenly required, good biscuit might be found a most convenient article to have at hand.

The great imperfection of the ration, at most stations, is the deficiency of good, wholesome vegetables, especially potatoes. At several stations these can be always procured, at others not so easily. At the latter, preserved potatoes and peas (English) should be kept in store, to supplement the deficiency, as many of the country vegetables are disliked, or at least not cared for by the men. The really good and unobjectionable ones are carrots, the large Bombay onions, good yams (the Bendiki), and with these, at stations where the supply of potatoes is precarious, ½ lb. of potatoes, or of preserved ones in corresponding proportion, would be ample; but at stations, such as Bangalore and Wellington, the men should have ¾ lb. of potatoes.

Surgeon Murphy, of Her Majesty's 91st, has lately proposed that, at the season when vegetables of all kinds are so scarce at Kamptee, instead of extra rice, a portion of dholl, the ordinary pea or grain of the country, should be substituted, as being so much richer in nitrogenous elements than rice. I think the suggestion a very good one; but the station, or rather Commissariat, authorities did not consider they had the power to alter the specified ration, although no extra expense would be incurred.

Stables for European Cavalry.—In my last year's Report I advocated this. Another year's experience has confirmed my opinion that, until stables are erected, the men of this arm—of course I include the Royal Artillery—must necessarily be frequently subjected to undue exposure, not only to the sun, but to rain and wet ground, which cannot fail to be injurious.

Bangalore, Madras Presidency, 15th August, 1862.

BENGAL.

[The following Topographical Sketches of Bengal and the North-western Provinces of India have been collated by Staff-Surgeon Dr. Crawford, and prefixed to such Sanitary Observations, in regard to the European Troops, as available Reports in this Office have been the means of affording, under non-receipt, yet, of the Special Sanitary documents for 1861.]

The Departmental Report on this Presidency, for 1860, opens with an expression of regret that it had not been found practicable to obtain the special Sanitary Reports from regiments and stations in this extensive Command before committing the annual volume to the press. Unfortunately we have been again unable to obtain the Annual Reports from Bengal in time to give detailed information regarding the sanitary condition of the troops in that Command during the year now under review, nor is there any hope that a moderate delay in the issue of the Report would enable us to do this.

In the absence of more recent information recourse has been had to previous reports from Bengal; but in some instances those for 1860 have been made out on obsolete forms, and do not enter into the various points affecting the health of the troops; in others the local conditions are described as transitional, and in not a few the troops had not then settled down after the operations in the field consequent on the late mutiny. Under such circumstances the medical officers justly ascribe the then existing sickness as in a great degree attributable to, or influenced by, causes no longer in operation, while the conditions under which the troops were then living were probably laying the foundation for the outbreak of other forms of disease.

These, and other circumstances to which it is unnecessary to refer, preclude the realization of the hope once entertained that the volume for 1861 would contain a tolerably complete *résumé* of the sanitary state of the camps, garrisons, and quarters of the British Army, in every part of her Majesty's Dominions.

In the absence of more precise information regarding the actual conditions under which the sickness and mortality recorded in the statistical section of this volume originated, a few general remarks on the conditions under which the troops serving in Bengal are placed may not be altogether without interest. To make these intelligible it is necessary to explain, that by "Bengal" is to be understood that extensive and very important Military Command, over which the highest military authority in India exercises direct and immediate control. Territorially considered, Bengal may be taken to include Bengal proper, the North-west Provinces, Oudh, the Punjab, and the minor and subordinate petty Principalities, which, although to some extent independent, are partially garrisoned by British troops. This territory extends from Calcutta to the Cabul frontier, and embraces many varieties of climate, all of which are worthy of special notice, and demand careful study from those whose duty it is to guard the British soldier against their injurious influences. The subject is too extensive to be discussed in detail in a report like the present, but there are some general conditions of climate which, though common to the whole of India, are so modified by local circumstances as to justify a passing allusion to them, in the hope of directing attention to their careful study in relation to their influence on the health of the European soldier.

The seasons, for example, are distinctly divided into the hot and cold common to other regions in the northern Tropic, but they are modified in various parts of Bengal by circumstances which are, to some extent, dependent on terrestrial or geological peculiarities. The hot season in Bengal sets in early

in March; in the North-west Provinces and the Punjab a little later. In June the intense dry heat is moderated by the approach of the South-west Monsoon, which is generally accompanied by a refreshing, and in many places a heavy and continuous fall of rain, and which is followed after a short interval by the North-east Monsoon. These rains occur periodically, and with much regularity, and modify the excessive heat of the latter part of the season by cooling the earth's surface, and covering it with a mantle of green, removing, at the same time, the intense and disagreeable dryness of the air, which is one of the most noteworthy and characteristic features of the hot season.

In many parts of India the rainfall during the monsoon season is excessive, and is believed to contribute largely, although probably indirectly, to the prevalence of the intermittent fevers which occur at that season. In the North-west Provinces and the Punjab, however, the annual rainfall is not materially in excess of what occurs in England, the chief difference being that in these provinces the rains are limited to a few months in each year, whereas in England the fall is distributed more equally over the several months of the year.

The prevailing winds blow from South and West from April to August inclusive, and from North and East from October to February or March, becoming variable towards the termination of the respective periods. September is generally a still, close, hot, and oppressive month all over India. The atmosphere is loaded with moisture, and the ground is saturated with rain, and covered with an exuberant and decaying vegetation, the products of which hang in the still air to a very deleterious extent.

The excessive dryness of the air, and the intensity of the heat in those stations removed from the influence of the sea-breeze during the months of April, May, and part of June, are powerful influences in the production of the ardent fevers, apoplexies, and asphyxias which commonly occur during that period; but there can be little doubt that with these are combined other meteorological influences which act on the human frame, either for good or evil, according to their normal or abnormal conditions, *e.g.*, the electrical state of the atmosphere, the state of the surface of the ground, changes in the respirability of the air resulting from the presence of fine particles of dust and other foreign bodies, as well as from its expansion by heat which not only renders its respiration more difficult, but, relatively, lessens the volume of air breathed as compared with a colder atmosphere, and thereby diminishes the quantity of oxygen available for arterializing the blood.

The cold season throughout Bengal extends from November to February inclusive, and is cool and agreeable in all parts of the country, even in the plains, where the heat of the day is compensated for by the cool refreshing influence of the night. In the North-west and the Punjab the winter months are so cold as to render fires desirable, if not absolutely necessary for the health and comfort of the sick.

These general characters of an Indian climate are the natural results of geographical conditions common to other countries similarly situated as to latitude, continuity of surface, &c., and would not call for special notice here were it not for the modifications to which the climate of some parts of Bengal is liable, in some instances from the effect of geological formation, and in others of a thoughtless disregard, by man himself, of the commonest hygienic laws.

Remarkable illustrations of these modifying influences are met with at Calcutta, in Oudh, and in the Peshawur Valley.

The climate of Calcutta, for example, is materially influenced by its position on the banks of a large tidal river, one of the many outlets of the Ganges which ramify through the extensive alluvial formation at its mouth, known as the Delta of the Ganges, and in the vicinity of extensive salt marshes, which impair its salubrity to a very serious extent, and the ill effects of which more than counterbalance the advantages of its proximity to the sea.

In Oudh the conditions are very different. The country is flat, and well watered by rivers whose tortuous streams offer a surface of pure water of enormous extent, from which the thirsty air laps up an amount of moisture, sufficient to exercise a most favourable influence on its temperature and dryness, and consequently on its respirability, which is very naturally modified

thereby. The fertility of the soil adds another element to the modifying conditions which obtain in Oudh, not met with in other parts of India less favourably circumstanced as to water supply.

In Central India, where similar geographical conditions obtain (minus the water), the climate is less favourable to the European. It is probably true, that the intermittent fevers which prevail in Lower Bengal and Oudh, are to some extent attributable to the presence of water, either in large, shallow jheels, or sufficiently near the surface of the ground to be under direct solar influence. It must not be forgotten, however, that these fevers are common all over India, and that although they certainly prevail to a greater extent in marshy localities, both in tropical and temperate climates, there is much need for reconsidering their etiology with reference to water as a cause, apart from solar heat, and also with reference to the influence of the latter alone. The periodicity which marks a large proportion of diseases occurring in India, and which is the diagnostic feature of the so-called malarious fevers, will be found on careful examination to be largely influenced by, if not directly attributable to, the intermitting effect of solar heat on the nervous system.

The Peshawur Valley is a still better illustration of the influence of local conditions on climate. Lying between Latitudes 33° and 35° north, its distance from the Equator should exercise a material influence on its climate, more particularly as to temperature, and yet the great military station in its centre is, for certain months in the year, one of the hottest in India. The vicissitudes of temperature are extreme, the thermometer ranging between 117° in July, and 36° in January. The relative degree of moisture and dryness of the air is equally exaggerated, the wet and dry bulb thermometers show an average monthly difference, varying from 17° in June, to 3° in January. The reports are silent on the electrical state of the atmosphere, and other meteorological matters of importance in estimating the salubrity of a climate; there is little doubt such conditions are as variable in intensity in this extraordinary valley as the degree of heat or moisture. The occasional stillness of the atmosphere is often the means of intensifying the inconvenience resulting from heat, to a degree which is almost intolerable.

These peculiar meteorological conditions are chiefly attributable to the geological formation, and geographical relationships of the district. The Peshawur Valley bears a close resemblance to the shape of a horse-shoe, the open part being directed to the east, and is about 2,400 square miles in superficial area. It is very fertile, and well watered by rivers which spring from the Indian Caucasus. The town of Peshawur is a large, populous native city, from which the cantonment, two miles distant on the Cabul side, takes its name, and draws the chief portion of its supplies. The southern limit of this valley is bounded by spurs from the Soliman Mountains, which merge into the Great Salt Range at Attock, and the northern by the snow-clad Himalayas. The melting of the snow on these mountain ranges is the chief source of the water supply on which the fertility of the valley depends, and is, in at least one instance, directly detrimental to the salubrity of the camp by feeding a marsh, or "jheel," in the vicinity, to which the prevalence of malarious fevers is attributed.

Other marked deviations from the normal climate of corresponding latitudes exist in many parts of Bengal, while the "Hills" and mountain ranges, which bound, and intersect its vast plains, supply a range of climates from which those who are able to do so, may select a variety suitable to almost all conditions of men free from organic diseases, and agreeable as changes to those whose avocation entail a residence in the plains for a large portion of the year.

Disregard of some of the more common principles of sanitation might be illustrated by reference to the condition of a large majority of the older stations in Bengal, and of these by far the most injurious are surface crowding and defective drainage. This is to some extent attributable to the unsettled state of opinion regarding the principles which should govern a military cantonment, and the antagonism inseparable from the clashing of strategic and hygienic considerations. The arrangements, for example, which enable the smallest number of men to defend a place against attack, are incompatible with that segregation of the force which is desirable on sanitary grounds. In drainage also, the conflicting views of eastern and western sanitarians have contributed

to retard the adoption of efficient measures; and, till the principles upon which the drainage of inter-tropical stations should be effected, have been settled, and the mode of scavenging finally determined on, this must necessarily be the case. Surface drainage to remove superfluous rainfall, the total prohibition of cesspools and covered sewers, and the deportation of all decaying organic matters seem to be the measures most generally approved of, and on this principle the new stations are being arranged. It will be well to keep in mind, however, that in all countries it is essential the foundations and floors of barracks should be kept dry by appropriate subsoil drainage, suitable to each locality.

A sketch of the sanitary circumstances of each station might be compiled from the returns of 1860, but, as has been already stated, the period was transitional. In many places new barracks and hospitals were under construction, and huts, lavatories, cooking and scavenging arrangements were undergoing important modifications, so that a description of their then existing state would not be applicable to the present time (January, 1863), while the health of the troops, in a large number of stations, has materially altered for the worse, from circumstances of which no account has been received. The following general remarks will, however, give a fair idea of the state of the garrisons in Bengal, up to the latest date to which the special reports extend.

Barracks.—In many instances these are temporary, but good of their kind. In some stations they have been extemporized under pressure of circumstances, and have been run up as cheaply and as rapidly as possible. The complaints under this head are not numerous, however, and have in most instances, doubtless, ceased altogether ere this. The new permanent barracks are built on the most approved plans, and leave little to be desired as to principle. They are a vast improvement on the old hollow-square system of 50 years ago. In the older barracks the numerous alterations and improvements introduced, and the increased cubic space allowed to each inhabitant, have removed many of the more obvious objections to them, and there is reason to believe a few years will see the British troops serving in Bengal satisfactorily housed, and relieved from many of the risks to life heretofore resulting from defective cantonment and barrack arrangements.

The indifferent lighting of the barracks throughout India is a constant source of complaint, and the discomfort, and forbidding aspect of a barrack-room lighted, as is customary in India, to an extent which is barely sufficient to enable the men to move about, has the worst possible effect, and drivee them forth to seek more inviting places to spend their idle hours. The contrast between canteens and barrack-rooms is in this respect one of the most noteworthy defects of our Indian barrack administration. Sir H. Rose gives forcible expression to his opinion on this subject in a letter forwarding the Sanitary Reports for 1860. He says—"The indifferent lighting of the barracks is a subject I would beg to bring to notice: the comfort to the men of a well-lighted barrack-room would be great, while the additional expense entailed would be comparatively small."

The Bath and Ablution Arrangements, so essential to health and comfort in this country, are everywhere undergoing additions and improvements, and the necessity of making them as complete as practicable, is now universally admitted, and will no doubt be acted upon.

Conservancy and Sewerage Arrangements are not by any means perfect. Numerous complaints of defects in drainage, and the existence of objectionable cesspools in some of the older stations, are recorded. In Calcutta the drainage of the native portion of the town is permitted to escape into a jheel, the malarious emanations from which are said to be injurious to the health of the inhabitants, and productive of fevers among the troops. At Mean Meer, Mooradabad, Allahabad, Benares, Lucknow, and other stations, exception is taken to the state of the drainage and sewerage, but measures are in progress at all these places for remedying defects.

The principle of *Dry Scavenging*, now generally adopted throughout Indian cantonments, will remedy many existing sanitary defects, and secure the troops from such evils for the future.

Many suggestions bearing on the sanitation of barracks, &c., are to be found

scattered through the Reports, among which the most frequently urged is the free use of lime, and lime-wash, as a detergent. Surgeon Smith, of the 51st Regiment, then stationed at Mean Meer, writes:—"By an order of long standing in the regiment, and one which is of great sanitary importance, the whole of the furniture was every Saturday morning removed from the barrack-rooms and placed in the sun, and the floors were thickly sprinkled with lime, which was allowed to remain on them some hours. When sufficient time had been allowed for the lime to act on the organic matters which, in spite of every precaution, will accumulate in barrack-rooms, the floors were swept and the furniture replaced." Unfortunately, Dr. Smith goes on to say, this wholesome practice was unavoidably abandoned in consequence of the refusal of the local authorities to sanction the issue of the requisite amount of lime for the purpose.

Diet.—The diet of the troops throughout the Bengal Command is favourably reported on by a majority of medical officers, though a considerable proportion of them think there is still room for improvement, more particularly with reference to the kind and amount of vegetables supplied; and it is very generally held that great advantage would be derived from the more regular and liberal use of potatoes.

A few suggest a decrease of the animal, and an increase of the vegetable elements of the ration during the hot season, but there is reason to believe the quality of the meat ration is not sufficiently good to justify any diminution in the quantity. Indeed, the practice pursued by the men of adding to the animal portion of their ration may be taken as evidence that the quantity is not in excess of their requirements. The Indian mode of cooking affords opportunity of varying the dinners at the discretion of the men. The results are generally approved of.

Prison Diets are said to be insufficient for men under sentence of long imprisonment, and it is often necessary to supplement their usual diet; but, as this is to some extent in the hands of the local military authorities, it is usually remedied before injury to individuals occurs.

While speaking of the soldier's ration, it may be well to notice the recent changes in the mode of dieting the sick. Heretofore the ordinary diet scale of Indian Hospitals was very meagre and defective in variety, so that the issue of extra articles of diet in almost every case of sickness was unavoidable. To obviate this, and to assimilate the scale of diets in Indian hospitals to that in use at home as far as possible, the following General Order was issued by the Indian Government:—

Fort William, 30th October, 1862.

No. 972 of 1862.—The Right Honourable the Governor-General in Council is pleased, with the concurrence of the Commander-in-Chief, to sanction, experimentally for twelve months, the adoption of new hospital diet scales in the Bengal Presidency.

2. Hitherto there have been only five kinds of hospital diet, viz., full,, half, low, milk, spoon. These, in the absence of other varities, have been supplemented by extra article, in the prescription of which medical officers have been allowed a latitude that is necessary with so narrow a scale, while it is too wide for an efficient control of hospital expenditure.

3. For the next twelve months the following hospital diets will be observed in the Bengal Presidency, viz.:—

Spoon,	Low, with Pudding,
Tea,	Low,
Beef Tea,	Half,
Low Milk,	Fish,
Milk,	Full.
Chicken,	

The components of these diets and their distribution are shown in the annexed Table. The officiating Principal Inspector General, Medical Department, will issue a circular based on Dr. Forsyth's Report of 15th March, 1861, in explanation of the differences between the old scale and the new.

4. The eleven diets now prescribed have been so constructed as to dispense almost entirely with the exhibition, in any case, of any extras, except wine,

beer, spirits, lemonade, soda-water, and lime-juice, which cannot be included in any ordinary dietary. The Deputy Inspector-General of Hospitals, and the Examiner of Medical Accounts will give especial attention to this object of the revised dietary.

5. The "separate statement," as a separate document, is to be dispensed with. Medical officers will have no difficulty in selecting from the different kinds of diet that which in each case will best suit the requirements of their patients. All expenditure extra to the authorised diet table should be accounted for in a separate "diet sheet," similar to that in use in Her Majesty's British hospitals, bearing the initials of the prescribing surgeon, written on the day on which the articles may have been prescribed.

6. The Form of Diet Roll in use in Her Majesty's British Army being considered more perfect than the one now in use in Bengal, is to be introduced and made applicable for this country, as, owing to the causes of the disease and the patient's name being shown therein, the Deputy Inspector-General of Hospitals and Examiner of Medical Accounts will be enabled to judge more correctly than they can do at present of the propriety of the expenditure.

7. It is also directed that daily abstracts of diets and liquors be prepared by the Apothecary from the Surgeon's diary, or bed-head tickets, and by him made over to the steward, signed by the medical officer. From these abstracts the Steward will prepare the diet roll, which will be daily inspected, and which will bear the initials of the prescribing Surgeon, the issues being entered in words by the Surgeon after verification of the entries by comparison with his own diary. This roll will be sent in daily to the Commissariat Department without erasures or alterations of any kind whatsoever.

8. The issue of nutmeg, cinnamon, and ginger as separate condiments for flavouring puddings,* sago, arrowroot, &c., will cease, "spice-powder" being substituted for them. The powder, put up in two or four-ounce canisters, will be furnished, on special indent, by the Commissariat. The canisters are always to be in the Steward's custody, and the expenditure daily recorded. Ten or twelve, never more than fifteen, grains are ample to flavour puddings, &c.

9. For diets into which meat enters, black pepper will be issued on the scale of one ounce for every 48 diets, or one-third of a drachm for each diet, instead of, as at present, one drachm for each diet.

10. The existing mode of supplying beer and spirits for hospitals admits of improvement. Great loss is sustained on beer for hospitals bottled in Calcutta, and purchased by the Commissariat either in Calcutta or up-country. On the other hand, draught beer from the canteens, or that bottled in Local Commissariat Godown's, is generally of a more uniformly sound quality than beer purchased in the market. Again, in the majority of cases where ardent spirits are exhibited, rum can be advantageously substituted for brandy as an equally efficacious cordial or stimulant, and one which, while cheaper, would be more acceptable to the men themselves than some kinds of brandy.

11. Medical Officers are accordingly invited to prescribe rum where they consider that it can be as beneficially taken as brandy, and draught beer, or beer bottled locally by the Commissariat Department, when they are satisfied that it is sound and good.

12. The rum must be the best in store, not less than three years old, and carefully bottled in the presence of the Executive Commissariat officer. A sufficient stock of good brandy must, at the same time, be kept in store for any cases in which it may be deemed preferable.

13. It is also to be distinctly understood that the Medical Officer in charge of an hospital is free to use his own discretion in prescribing bottled beer, as heretofore, for any of the sick.

14. The measures for meting out milk and wine not being of uniform capacity are to be withdrawn from use, and fluid measures of the kind noted,† tested and stamped at the Mint, are to be issued in lieu to all European hospitals.

* Now reduced to two, viz., rice and custard.

† For wine, double, to contain two fluid ounces at one end, and one fluid ounce at the other. For milk, single, to contain three fluid ounces.

15. This cancels the rule in paragraph 5, page 121 of the Medical Code of 1851, which fixed the proportion of ten measures to a proper sized English quart bottle or forty to the gallon.

16. The entire contents of a wine bottle, whatever the quantity may be, shall be expended for the sick only. Medical Officers in charge of hospitals will enforce this rule strictly, and the Steward will henceforth be required to account minutely for the contents of each bottle.

17. Twelve months after the adoption of the new diet scales, a report will be furnished by Medical Officers in charge of hospitals, with especial reference to the substitution of rum for brandy, and of draught or Commissariat-bottled beer for that which is bottled in Calcutta.

Table of Hospital Diets for European Troops.

Articles comprising the different Diets for a Day. Avoirdupois Weight.

Spoon :—Sago 2 oz., Tea ¼ oz., Sugar 2¼ oz., Milk 6 oz. Rice 2 oz., Salt 2 drs., for Conjie Water.

Tea :—Bread 8 oz., Tea ¾ oz., Sugar 2½ oz., Milk 9 oz. Rice 2 oz., Salt 2 drs., for Conjie Water.

Beef-tea :—Bread 12 oz., Tea ½ oz., Sugar 1½ oz., Milk 6 oz., Beef 1 lb., Salt 5 drs.

Low Milk :—Arrowroot 3 oz., Milk 1½ pt., with 6 oz. for tea ; Sugar 3 oz., including ¾ oz. for Tea ; Tea ½ oz. Sago may be used in lieu of Arrowroot, in the proportion of 2 oz. Sago to 1 oz. of Arrowroot.

Milk :—Bread 12 oz., Rice 3 oz. (including 1 oz. for Conjie Water), Milk 2 pts., and 6 oz. for tea ; Butter ½ oz., Sugar 2¼ oz. (including ¾ oz. for tea), Tea ½ oz., Salt 2 drs.

Chicken :—Fowl, made into soup or boiled, 8 oz. ; Bread 8 oz., Tea ½ oz., Sugar ½ oz., Milk 6 oz., Butter ½ oz., Salt 5 drs. Milk 1 pt., Sugar 1 oz., Eggs 2, for Custard Pudding.

Low, with Pudding :—Mutton, in broth, 8 oz. ; Bread 8 oz., Tea ½ oz., Sugar 1½ oz., Milk 6 oz., Butter ½ oz., Onions 1, Barley ½ oz., Flour ½ oz., Salt 5 drs. Rice 2 oz., Milk ¾ pt., Sugar ¾ oz., Eggs 2, for Rice Pudding.

Low :—Mutton, in broth, 8 oz. ; Bread 12 oz., Tea ½ oz., Sugar 1½ oz., Milk 6 oz., Butter 1 oz., Onions 1, Barley ½ oz., Flour ½ oz., Salt 5 drs.

Half :—Mutton 8 oz., Bread 1 lb., Potatoes 8 oz., Tea ½ oz., Sugar 1½ oz., Milk 6 oz., Butter 1 oz., Onions 1 oz., Barley ½ oz., Flour ½ oz., Salt 5 drs.

Fish :—Fish 8 oz., Bread 1 lb., Potatoes 8 oz., Tea ½ oz., Sugar 1½ oz., Milk 6 oz., Butter 2 oz., Salt 5 drs.

Full :—Meat (either beef or mutton) 1 lb., Bread 1 lb., Potatoes 12 oz., Tea ½ oz., Sugar 1½ oz., Milk 6 oz., Butter 1 oz., Onions 1 oz., Barley ½ oz., Flour ½ oz., Salt 5 drs. In this diet the meat may be roasted or boiled. In such cases the diet to be marked "Full varied ;" and onions, barley, and flour to be excluded.

Breakfast.

Spoon :—Tea 1 pt., Sugar ¾ oz., Milk 3 oz.

Tea :—Tea 1 pt., Bread 3 oz., Sugar ¾ oz., Milk 3 oz.

Beef-tea :—Tea 1 pt., Bread 4 oz., Sugar ¾ oz., Milk 3 oz.

Low Milk :—Tea 1 pt., Arrowroot in Jelley 1 oz., Sugar ¾ oz., Milk ½ pt.

Milk :—Tea 1 pt., Milk 1 pt., Bread 4 oz., Sugar ¾ oz.

Chicken :—Tea 1 pt., Bread 3 oz., Butter ¼ oz.

Low, with Pudding :—Tea 1 pt., Bread 3 oz., Butter ¼ oz.

Low :—Tea 1 pt., Bread 4 oz., Butter ¼ oz.

Half :—Tea 1 pt., Bread 6 oz., Butter ¼ oz.

Fish :—Tea 1 pt., Bread 6 oz., Butter ½ oz.

Full :—Tea 1 pt., Bread 6 oz., Butter ½ oz.

Dinner.

Spoon :—Sago in Jelley 2 oz., Sugar ¾ oz.

Tea :—Tea 1 pt., Bread 3 oz., Sugar ¾ oz., Milk 3 oz.

Beef-tea :—Beef-tea 12 oz., Bread 4 oz.

Low Milk :—Arrowroot in Jelly 1 oz., Sugar ¾ oz., Milk ½ pt.
Milk :—Rice 2 oz., Milk 1 pt., Bread 4 oz., Sugar ½ oz., in Rice-milk.
Chicken:—Chicken 8 oz., Bread 3 oz. Custard Pudding.
Low, with Pudding :—Mutton Broth 1 pt., Bread 3 oz. Rice Pudding.
Low :—Mutton Broth 1 pt., Bread 4 oz.
Half :—Mutton in Broth 1 pt., Meat, roasted or fried, 3 oz.; Bread 4 oz., Potatoes 8 oz.
Fish :—Fish 8 oz., Bread 4 oz., Potatoes 8 oz., Butter 1 oz.
Full :—Broth or Soup 1 pt., Meat 1 lb., Bread 4 oz., Potatoes 12 oz.

Supper.

Spoon :—Tea 1 pt., Sugar ¾ oz., Milk 3 oz.
Tea :—Tea 1 pt., Bread 2 oz., Sugar ¾ oz., Milk 3 oz.
Beef-tea :—Tea 1 pt., Bread 4 oz., Sugar ¾ oz., Milk 3 oz.
Low Milk :—Tea 1 pt., Arrowroot 1 oz., Sugar ¾ oz., Milk ¼ pt.
Milk :—Tea 1 pt., Bread 4 oz., Butter ½ oz.
Chicken:—Tea 1 pt., Bread 2 oz., Butter ½ oz.
Low, with Pudding:—Tea 1 pt., Bread 2 oz., Butter ½ oz.
Low :—Tea 1 pt., Bread 4 oz., Butter ½ oz.
Half :—Tea 1 pt., Bread 6 oz., Butter ½ oz.
Fish:—Tea 1 pt., Bread 6 oz., Butter ½ oz.
Full :—Tea 1 pt., Bread 6 oz., Butter ½ oz.

Beverages and Canteen Supplies.—These are described as of good quality. The beer, porter, spirits, &c., sold in the canteens in India are procured and issued to regimental and cantonment canteens under Government supervision, and are generally wholesome of their kind.

Clothing.—Much has been done of late years to ameliorate the condition of British soldiers in this respect, and nowhere has the result been more satisfactory than in India. The direct and explicit testimony of both officers and men, as to the advantages resulting from recent changes in dress, leaves no doubt on this subject, and, although the varieties of climate which obtain in Bengal demand great attention to clothing, and frequent modifications necessary to meet the requirements of particular stations, there seems to be little to desire in this respect. The head dress is not yet perfect, but it is a great improvement on that previously in use; and the leather stock is no longer a bone of contention, as its use has been altogether abandoned in India.

Duties and Exercises.—These have been generally light and harmless. The drills usually take place in the mornings and evenings, at hours most favourable, and the more trying battalion and brigade exercises are carried on chiefly during the cold season. The employment afforded by the rifle instruction is stated by Surgeon Smith, 31st Regiment, to have been rather beneficial than otherwise, and, from the silence of the medical officers generally, it is fair to infer that it has not been injurious.

Recreations and Amusements.—Quoits, skittles, cricket, fives and "long-bowls," are the usual out-door games and amusements available at Indian stations. In some instances theatres, reading rooms, and minor in-door amusements supplement these, and enable the well-disposed soldier to get through the heat of day (the most trying part of his Indian life) with tolerable satisfaction. Efforts to establish gardens and workshops, which afford useful and reproductive employment to the more industrious, have not been neglected. The highly-important General Orders issued by the Commander-in-Chief in India on these subjects, indicate the value set upon such institutions, both by his Excellency and the Governor-General. It is to be hoped the private soldier will not fail to appreciate these efforts to ameliorate his condition, and provide him with the means of training up his children in habits of industry, and of educating them in useful trades and occupations; there is little doubt that the State will be amply remunerated for any contingent outlay by increased health, efficiency, and good conduct, which may be expected to result from these occupations, and the additional comforts they will place within the soldier's reach.

The great prevalence of disease believed to be preventable has attracted considerable attention during the last few years, and has in many instances resulted in the adoption of most important sanitary measures, both remedial and precautionary. One of the most noteworthy of these has been the publication of a General Order by Sir Hugh Rose, which embodies many valuable observations, and which has been called forth apparently by the recent outbreak of cholera in Bengal, during which Her Majesty's 51st and 94th Regiments suffered so severely. The Report of the Special Commission appointed to investigate the causes of that outbreak has not been forwarded to the Medical Department at home, but it is believed the Commander-in-Chief's General Order embodies the practical results of its labours, and as it is of great importance to the army generally, it is given here, although of a date posterior to the period embraced in this Report.

Head-Quarters, Simla, 7th April, 1862.

1. Officers Commanding Divisions, Stations, &c., will make themselves thoroughly acquainted with the ground in the neighbourhood of their stations to the extent of 20 miles, with a view to at once selecting sites for encampments in the event of cholera appearing, and care will be taken to ensure these places being always kept in a fit state for occupation by troops, and with a sufficient supply of wholesome water available on each.

2. The officers of the Quartermaster-General's Department of each division will prepare a plan of the required extent of country, with the different encamping grounds marked on it, so that when the disease approaches measures may be at once taken to place the troops under canvas without delay.

3. On the outbreak of cholera in an epidemic form, either in neighbouring villages or cantonments, Officers Commanding Stations will be prepared to move the troops into the selected camps at the shortest notice.

4. As soon as any case of cholera is reported in the station, the troops will be moved into camp, and no unfavourable condition of weather is to prevent this movement being carried out.

5. The force will be broken up into as many detachments as the number of Medical Officers will admit, allowing one to each party. Should the Medical Staff be insufficient to afford such medical aid to the several detachments, experienced Medical Subordinates* will be placed in charge of the smaller or less distant parties.

6. Officers Commanding Stations are authorised to call directly for aid from other stations, divisions, or districts free from cholera.

7. The sick, labouring under other diseases than cholera, will move with the force, and share the benefit of removal from the cholera atmosphere.

8. It must be insisted on that all discharges from the stomach and bowels of cholera patients be instantly removed and buried in pits.

9. Strong deodorants are to be thrown into the receiving vessels, as well as into the pits, latrines, and privies.

10. Should cholera follow the troops, they will be moved short distances, at right angles, if possible, to the prevalent wind and tract of the disease, every second or third day, care being taken that the marches in no way fatigue the men.

11. The breaking-out of cholera in a regiment or at a station is on no account to cause the suspension of the soldiers' daily amusements and occupations, care being taken that the latter in no way fatigue them; and the Commanding Officers will use their utmost exertions to develop any recreation or employment of which the effect is to keep the men's minds in their normal state.

12. It often occurs that soldiers, on a visitation of cholera, indulge in the use of spirituous liquors, in the belief that they are a preventive against the disease.

The medical authorities unanimously condemn this supposed remedy as a certain promoter of the disease; Commanding Officers are therefore enjoined to use their utmost endeavours to prevent so baneful a practice.

13. One of the several cholera antidotes is the early treatment of pre-

* These are Warrant Medical Officers, who are known in India as Apothecaries and Assistant-Apothecaries.

monitory symptoms, of which looseness of bowels is a principal one; Commanding Officers are therefore requested to give the most precise orders on the subject, and to cause all men affected by premonitory symptoms to be placed at once in a premonitory ward.

14. The troops are not to return to cantonments until all traces of the cholera shall have disappeared from the neighbourhood, either amongst the European or native population. The barracks and hospitals will be thoroughly fumigated, the walls whitewashed, and the doors and window-frames painted before they are re-occupied.

15. The men will be supplied with hot tea and coffee before going out in the morning; they will invariably wear flannel belts, and all precautions must be taken to prevent their remaining in wet or damp clothes.

16. The Commander-in-Chief feels persuaded that all officers share his feelings, that when cholera breaks out in a station they should be with their regiments and at their posts.*

By order of His Excellency the Commander-in-Chief.

(Signed) E. B. JOHNSON, *Lieutenant-Colonel,*
Officiating Adjutant-General of the Army.

There are many questions connected with the etiology and diffusibility of cholera, and the best mode of warding off the consequences of an outbreak when it has occurred, which the tenor of this General Order seems to imply have been settled to the satisfaction at least of his Excellency; but, in the absence of the evidence upon which the conclusions on this very important subject are based, we must be content with the knowledge which past experience furnishes, and hope that measures so often tried with advantage by our forces in India, and so precisely laid down by the Adjutant-General in this practical embodiment of what is known on the subject, will be energetically carried out by all who are, or may hereafter be, entrusted with the command of our troops in India and elsewhere.

The prevalence of venereal disease is still a source of regret to both military and medical authorities in India, and the Commander-in-Chief endorses the representations of the Inspector-General of Hospitals on the growing necessity of devising a remedy for this evil. The establishment of lock hospitals, which was under consideration in 1861, has not yet been decided. On this subject Sir Hugh Rose writes:—"In my letter of the 13th September, 1861, transmitting the Sanitary Reports from 1st April to 31st December, 1859, I had the honour to remark that the question of lock hospitals was under the consideration of Government, and I beg to state that no decision on the subject has as yet been come to; and I would venture to

* On the 23rd of June, 1862, the foregoing General Order was supplemented by the following:—

1. On the occasion of an outbreak of cholera, such changes in the diet and such other medical comforts are to be allowed to the sick, as the Deputy Inspector-General of the circle, or other Principal Medical Officer may deem expedient.

2. Wood fires, if considered necessary, are to be maintained to the windward of the camp.

3. The railway is to be used for the conveyance of troops through the infected tract (? when practicable).

4. In wet weather cots are to be carried for all the men, to prevent them sleeping on the damp ground.

5. On the requisition of Medical Authorities, Commanding Officers are to indent on the nearest magazine for such additional camp equipage as may be considered necessary, the indents to be countersigned by the Deputy Inspector-General (of Hospitals) of the circle and the Officer Commanding the Station.

6. The Deputy Inspectors-General of Hospitals being the officers specially appointed by Government to judge of the extent to which the recommendations of medical officers should be complied with, the Commander-in-Chief desires that their opinion may, whenever practicable, be obtained. In the event of their absence from the station, the opinion of the Senior Medical Officer may be acted upon.

(Signed) E. B. JOHNSON, *Lieutenant-Colonel,*
Officiating Adjutant-General.

solicit attention to the remarks of the Inspector-General of Hospitals on the extensive prevalence of venereal disease as one great source of inefficiency among the men, and to the complaints of the medical officers as to the little authority that can be brought to bear on the native prostitutes."

"The Inspector-General strongly advocates the official supervision of the women, and the establishment of lock hospitals, and I would venture to express my concurrence with his opinion on this subject."

REVIEW OF THE PROGRESS OF HYGIENE DURING THE YEAR 1862.

By E. A. PARKES, M.D., F.R.S., Professor of Hygiene in the Army Medical School.

THE object and scope of this Review of Hygiene were explained last year. It is not intended to make it a complete record of the progress of hygiene, for it would be impossible to allow sufficient space for this. All that is aimed at, is to supply Army Medical Officers with a summary of the most important facts which have been made known in the preceding year, and which seem likely to be interesting to them.

The following is the order of arrangement :—

I. Enumeration of Military Medical Works.

II. General Hygienic Conditions.
- Air.
  - *a.* Suspended matters.
  - *b.* Gaseous impurities.
  - *c.* Air over marshes.
- Ventilation.
- Water.
  - *a.* Method of examination.
  - *b.* Effect of impure water on health.
- Food.
  - *a.* Preserved food.
  - *b.* Adulteration.
  - *c.* Diseases arising from bad quality.
    - Malignant pustule.
    - Tænia medio canellata.
    - Trichina disease.
- Sewers and deodorization.

III. Spread of the Specific Diseases.

IV. Campaigns.
- The Mexican War.
- The American War.

I. ENUMERATION OF WORKS ON MILITARY HYGIENE.

An useful work, entitled "Health in the Tropics," has been published by Mr. Moore, of the Bombay Service, and can be recommended as a very sensible treatise on "Sanitary Art applied to Europeans in India." It is not so rich in instances, or so full in statistical records, as Chevers' admirable papers, from which some of it has been derived ; but its arrangement is good, and the rules laid down appear to be almost invariably sound.

Baron Larrey has published a brochure on the Construction and Hygiene of Hospitals ; the principles advocated by him are similar to those now advised in this country. Reference is made to the arrangements in the Italian War of 1859, of which the main feature was the distribution of the sick men into numerous small hospitals, instead of assembling them in enormous establishments.

A "Manual of Military Surgery" has been published by a Confederate surgeon, Dr. Chisholm. The hygienic part of this work will be hereafter given.

Dr. Milroy has written an excellent pamphlet "On the Health of the Royal Navy," which is well worthy of the attention of military surgeons.

Although not a military work, the lectures of Dr. W. T. Gairdner, on "Public Health in Relation to Air and Water," may be mentioned as an interesting semi-popular discussion on a subject which is only just beginning to be properly understood. In spite of all that has been done, it can be truly said that the agencies of impure air, and water, and food, in producing disease, have not yet been sufficiently worked out. Dr. Gairdner's work is a valuable addition to our knowledge.

II. Notice of the most Important Papers on the General Hygienic Conditions. Air and Ventilation.

Suspended Matters in Air.—Reference was made in last year's Report to the observations of Pouchet, Eiselt, Sanderson, and Frank, on substances floating in the air. Enough has been since done to show that this mode of investigation is likely to lead to results of the greatest interest. Devergie examined the air in the vicinity of a patient with hospital gangrene, and "detected an enormous proportion of organic matters" in it; and Chalvert, in the wards of St. Louis,* found that the dust collected when the wards were being cleaned, consisted in great measure of organic matter, especially of epithelium cells, which, when burnt, gave out an odour of horn, and when moistened, and allowed to decompose, produced a fœtid putrid smell. In one analysis there was 36 per cent., and in another 46 per cent. of this organic matter in the dust.

At Fort Pitt, during 1862, a good many experiments were made on this point; the aeroscope of Pouchet was found, however, to be less convenient than simply drawing the air through water. The best arrangement seems to be as follows—a short wide tube is made to reach to the bottom of a small quantity of pure water, or of a solution of permanganate of potash of known strength, or of glycerine. Probably a weak solution of magenta (which has been shown by Dr. Roberts to have an extraordinary effect in colouring nuclei) might be used with advantage. By means of an aspirator, the air is drawn through the water, at the bottom of which all solid particles are arrested, and can be examined with the microscope. This is, in fact, precisely the same plan which was used by Dr. Dundas Thomson, in his observations on the air in cholera wards, in 1854. It is certainly remarkable what quantities of substances are thus shown to be floating in the air, even in well-ventilated wards; bits of wool, cotton, particles of hair, and epithelium cells from the skin, are the most common. Small cells, whose origin is uncertain, are also seen; particles of dust and starch occasionally, and other bodies of uncertain nature and origin. Figures of some of these substances are given in the Report on the Ventilation of the Barracks at Gravesend, by Messrs. Hewlett, Stanley, and Reed, printed in a former page.

All these facts not only put in a clearer light than before the necessity of ventilation, and the advantage of isolation of patients from whose bodies arise such quantities of organic particles and molecules, but they seem likely to place on an experimental basis the doctrine of the transference of morbific agents from one person to another. Even among healthy persons, the amount of epithelium which collects in an ill-ventilated room will surprise those who examine this point for the first time. Doubtless the friction of the skin, or coughing, and the separation of mouth and lung epithelium, are constantly sending into the atmosphere these extremely light particles, which, floating about, may be either drawn into the lungs of other persons, or may be taken into the mouth, and then swallowed. When the persons, instead of being healthy, are sick, and the thrown-off substances are therefore largely increased in amount, it seems but reasonable to suppose that greater effects result, and that we shall eventually be in a position to assign definite influences to the agency of these decomposing animal particles.

During the past year additional evidence has been given that arsenious acid derived from arsenical papers can be found in the dust of rooms (and,

* *Ann. d'Hygiène*, July 1862, p. 240.

therefore, doubtless in the air), and fresh instances, both in this country and in Germany, have been published of the effects produced. These effects are local and constitutional: the local are smarting of the neck, gums, eyes, and nose, œdema of the eyelids, little ulcers on hands, face, neck, or parts of the body on which the poison can alight; the constitutional are weakness, nerve-excitability, heaviness of the head, fainting, in some instances even convulsions, asthma, thirst, want of appetite, diarrhœa.

The last link in the chain of evidence that these effects are really due to arsenious acid floating in the air passing into the lungs or mouth, and swallowed, has been given. Two observers, Müller* and Kletzinsky,† have actually found arsenic in the urine of persons presenting these symptoms, and the latter observer found also traces of copper, derived, no doubt, from the arsenite of copper used in colouring the papers.

In addition to arsenite of copper (Scheel's green) and aceto-arsenite of copper (Schweinfürth, or emerald green), another green pigment is often used, which, though it does not contain arsenic, is said to be very hurtful: this is the "false Braunschweig green," which is composed of Prussian blue or indigo, and chromate of lead.

A simple test, given by Taylor, for the detection of arsenious acid and copper on papers or green dresses may be given. A piece of fabric is taken, and a drop of liquid ammonia let fall on it: if copper be present a dark blue is given; a little bit of nitrate of silver is then placed in the ammonia, and if arsenious acid be present the yellow arsenite of silver is at once found.

The immense effect of substances floating in the atmosphere in producing disease has been placed in a very clear light by the observations of Mr. Simon and Dr. Greenhow.‡

"Since 1858 a systematic investigation of the circumstances under which particular districts in England suffer an excessive mortality has been in progress, under the direction of the Privy Council." In 1861 the enquiries especially referred to the adult mortality from lung diseases, and into the causes of the mortality among children.

The result of the first part of the enquiry has been to prove that the great mortality from bronchitis, emphysema, and phthisis, in certain localities and in certain trades, is not owing to the unhealthiness of the English climate as so often asserted, or to exposure to weather, as commonly believed, but to the inhalation into the lungs of solid particles of various kinds; and a long list of trades is given in which this is the case. Grinders of metal of all kinds of course come in the first rank of unhealthiness; manufacturers of earthenware, especially china scourers and the shapers of earthenware; cotton operatives employed especially in the card-rooms, where much cotton fibre is diffused; flax-workers, especially those engaged in hackling and carding; and miners, with one signal exception. These artisans are all placed under unfavourable conditions generally, but the circumstance which dominates everything else is the diffusion of particles and molecules in the air, which are constantly drawn into the lungs, producing cough, emphysema, and, finally, breaking-up of the lung, and which by being swallowed cause also digestive derangement. No doubt there is not much that is novel in these observations, but they are invaluable in showing the immense extent of the evil, and the ease of prevention. The exception among the miners is very striking. The Northumberland and Durham colliers show a striking immunity from lung disease as contrasted with the colliers of Staffordshire, Wales, and other places, and with the lead, tin, and copper mines of Cornwall and Wales.

This is owing simply to the comparatively satisfactory ventilation of the northern collieries; and, to show that this is the real cause, it appears that in the case of certain collieries where ventilation is neglected, the ratio of lung disease is the same as in Staffordshire or Wales.

All these enquiries of Dr. Greenhow and Mr. Simon support the opinion that the origin of many lung diseases is to be found, not in grand climatic

* *Birkmeyer in Canstatt Jahresb, for* 1861. Band vii., p. 61. 1862.

† *Schmidt's Jahrb.*, 1862. No. 10, p. 123.

‡ *Fourth Report of the Medical Officer of the Privy Council*, 1861. Printed by order of the House of Commons, April 1862.

peculiarities, but in much simpler conditions; in fact, simply in the irritation produced in the lungs by the inhalation of organic or mineral particles. There are certainly other accessory causes, such as constrained positions, want of exercise, and exposure to vicissitudes of temperature; but these are all subordinate conditions. The enquiries which have appeared to trace the large amount of phthisis prevailing in the army to the inhalation of a vitiated atmosphere, may perhaps eventually be carried a step farther, and may show that the pulmonary effect is not owing to gaseous impurity, but to the mechanical effect of the manifold particles of different kinds which float about in the air of ill-ventilated rooms.

Gaseous Impurities in the Atmosphere.—The most important work on this head which has appeared during the year is the Report of the Select Committee of the House of Lords* on "Injury from Noxious Vapours." The Committee was appointed especially to enquire into the effects of the hydrochloric acid vapours disengaged from the soda works, but the enquiry was extended to the copper-smelting, from which large quantities of sulphurous acid are disengaged; to the cement works, from which carbonic acid, carbonic oxide, and other gases are given off; to sulphuric acid manufactories disengaging nitrous acid, and other similar works, and to the knackers and other trades of that class, the processes in which emit organic vapours. The result of the evidence was to show that both hydrochloric and sulphurous acid gas have a most destructive effect on vegetation, killing all trees and shrubs within a certain distance, which varies with the size of the works and the height of the chimney. At St. Helens, in Lancashire, the effect of the hydrochloric acid produced in the soda works extends for two miles or more. Animals also are injured, especially by the fumes from the copper works, which contain, not only sulphurous and sulphuric acid, but fluoric, arsenious, and arsenic acid, and particles of copper. The health of men, however, does not appear to be much affected; but it is rather singular that very little attention was directed to this point. The coke works, from which much carbonic oxide and carbonic acid, and some sulphurous acid, and sulphuretted hydrogen, with particles of carbon, are given off, exert a very bad effect on vegetation and on cattle. Sheep are less affected, except in the wool, which is lessened in quality to the amount of 1*d.* or 2*d.* per pound.

In the Portland cement works a very large quantity of carbonic oxide, and some sulphurous acid, nitrogen, hydrosulphate of ammonia, and hydrosulphuric acid, are given off. The effect on vegetation is not so bad as in the case of hydrochloric acid gas; but is still very well marked.

The Committee, in order to remedy the great and admitted evils to vegetation and animals produced by those several gases, make in their Report various suggestions, which will probably become law in this session. They recommend that the provision in the Smoke Prevention Act respecting offensive trades should be made of universal application; that gases emitted from chimneys should be placed on the same footing as smoke from furnaces, and that medical inspectors should be appointed, with power to enter works when in operation. For the alkali trade they suggest special legislation, and that, without prescribing the specific process by which the nuisance should be prevented, the Legislature should attach a substantial penalty to the escape of gas or vapour. Evidence was given that in almost all cases means could be taken to absorb or condense the noxious vapours without any injury or impediment to the trade.

The Air over Marshes.—The air of the Tuscan Maremma has been investigated by Becchi (*Comptes Rendus*, 1861, *and Pappenheim's Beiträge*, 1862, *Heft.* 3, *p.* 78). The marsh near Scarlino, reported to be the most unhealthy of all, was examined. The ground is made up of three layers.

The lowest layer contains little organic substance, and from 3·49 to 5 per cent. of chloride of sodium.

The middle layer contains 30 per cent. of organic matter, and 0·082 per cent. of chloride of sodium. Many of the plants are yet undestroyed, or a part are changed into humin, ulmin, and in humic, ulmic, crenic, and apocrenic acids.

The upper layer contains little organic matter, and only 0·014 per cent. of chloride of sodium: it is clayey.

* *Bluebook.* August, 1862.

This constitution of the ground is believed to be similar throughout the whole of the Maremma.

The examination of the air showed the oxygen and nitrogen in normal proportion; the carbonic acid was, however, much increased, particularly at night and during the summer. Ammonia was in variable quantity, but was more abundant in the summer, at which time, also, hydrogen was found in some quantity. The humidity was great: in summer there were often 20 grammes in a cubic metre of air (8·7 grains in one cubic foot). This was particularly marked in the Sirocco, when even healthy men were disagreeably affected. In the summer, also, by means of diluted sulphuric acid, a condensed organic substance was obtained, which, heated with soda-lime, gave traces of ammonia.

The dew examined in June, July, August, September, October, and November was clear, and without smell or taste; occasionally, but seldom, it had a marshy smell; its reaction was neutral. Frequently, after some days, algæ appeared in it. When evaporated, the dew left a dirty yellow residue, which at a higher temperature carbonized like a vegetable substance. Nitrate of silver gave a more or less dark red colour. Ozone led through the dew had no effect; chlorine destroyed the organic matter. These last reactions were, however, only marked in the dew of the unhealthy months, August and September; in the winter they were not present.

In August 1859, $\frac{27}{1000}$ of a milligramme (0·00027 grammes) of organic matter were found in a cubic metre (35·316 cubic feet) of air. The organic matter, distilled with sulphuric acid, gave marked indications of formic and acetic acids.

Ventilation.

The amount of air to be supplied per head per hour has been variously given by observers. The latest statement is by General Morin, the reporter of the Commission ordered to determine the ventilation of the Palais de Justice and the new theatres of Paris. The amounts (reduced to English cubic feet) are as follows. To keep the air pure there must be supplied—

In Barracks, by day	1,060	Cubic feet per head per hour.	
„ by night	2,120	„	„
In Hospitals, day and night	2,624	„	„
„ at time of dressing ..	4,237	„	„
„ during epidemics ..	5,649	„	„
In Prisons	2,120	„	„
In Theatres, Assembly-rooms, &c. ..	2,120	„	„
In Schools	1,060	„	„

In arranging for the ventilation of the new theatres in Paris, which is accomplished by the aspiration caused by the heat of the chandelier, General Morin has only been able to supply 1,060 cubic feet (30 cubic metres) per head per hour. The amount ordered for schools is certainly insufficient, considering the active respiration of young persons.

In the two Reports* which General Morin has published, the systems of artificial ventilation known in Paris by the names of the system of Thomas et Laurens (propulsion by fan and warming by vapour); the system of Duvoir (aspiration, and warming by hot-water-pipes); and the system of Van Hecke (propulsion, and warming by a calorifère), are discussed, and the preference is given to the system of Duvoir, as more equable and certain in its action, and more economical. This is, then, a reversal of the opinion which many entertained in favour of the fan ventilation of Laurens, and which others, as Pettenkofer, for example, have expressed in favour of the system of Van Hecke.

General Morin writes:—"The system of warming and ventilation by hot water and by aspiration is more simple, of a service more certain, and more economical, both as to cost of installation and of repair, and also of daily expence, than that in which steam and insufflation are employed. It furnishes as much fresh air (2,648 cubic feet to 3,177 cubic feet per head per hour), and allows at pleasure a greater evacuation of vitiated air (3,041 cubic feet to 3,531 per

* *Sur le Chauffage et la Ventilation des Batiments du Palais de Justice.* Paris, 1861.

hour per head), as the plan of ventilators by propulsion, the effect of which does not indefinitely increase with the rapidity given to them, nor even in proportion to the number of ventilators put in movement to supply the conduits.

"Under these different aspects the system of warming and ventilation by aspiration, by means of the circulation of hot water, seems to us preferable to all those which have hitherto been proposed and employed."

There is certainly one great advantage in this plan, viz., that the opening of the doors and windows does not impede, but aids the movement of the air caused by the aspiration; and even, if necessary, in summer additional openings direct to the external air may be used. In the other two plans the opening of doors and windows interferes with the movement. This is certainly an advantage, but General Morin does not allude to the unfortunate rule insisted upon in the French hospitals, which quite nullifies this advantage, viz., that the temperature shall always be 59° of Fahrenheit. As the amount of temperature is more easily noticed than the quantity of air supplied, and as the contractor is fined if the temperature falls below the contract point, he will never permit windows to be opened in winter for fear of introducing too much cold air, and will even supply air in lessened quantity, but more highly heated; and hence the infinite importance of an abundant supply of air is sacrificed to a fancied necessity of keeping up a constant temperature. The ventilation of the French hospitals will never be sufficient till this rule is altered.

The new Palais de Justice in Paris is about to be ventilated and warmed by the circulation of hot water, and the employment of a chimney aspiration, as in one part of the Hôpital Lariboisière, the ventilation of which was so strongly censured by Grassi some years ago. The new theatres are ventilated by means of the aspiration caused by the chandelier, many ingenious arrangements being introduced for the purpose of bringing in fresh air at all points, and at once carrying off the vitiated air. These could not be understood, however, without plans.

An useful Treatise on Ventilation has been published by Mr. Ritchie,* which can be recommended as giving an excellent description, both of natural and artificial ventilation. At page 166 is an account of the ventilation of the Circuit Court House at Glasgow, the Police Buildings at Edinburgh, and other places, in which a system precisely similar in principle and action to that selected by General Morin for the Palais de Justice has been for some years in action, and apparently with satisfactory results; and other instances are given of a similar kind. As in the so-called system of Duvoir, a small furnace in the basement heats the water in Perkins' small pipes, and coils of these at various points warm the air passing over them, and also cause an up-draught in an extracting shaft.

In the International Exhibition there were some models of ventilating tubes; but there was nothing new.

Water.

Dr. Woods, Staff Assistant-Surgeon, has published a paper† on the determination of organic matter in water by means of a standard solution of permanganate of potash. He points out the fallacies and difficulties of this method, which he tested by means of a great number of experiments not detailed in the paper, but concludes that with proper precautions it may be made to give reliable results. The solution of the permanganate is made of a strength of 1 milligramme to 1 C.C., and is graduated as usual by means of a standard solution of oxalic acid; a litre of the water to be examined, mixed with 2 C.C. of strong sulphuric acid, is heated to 140° Fah.; the lamp is removed, and the solution of the permanganate is dropped in. The process is ended when the slightest red tint, permanent for half an hour, is obtained. From the total quantity of permanganate used 0·24 C.C. are deducted, as this is.

* *A Treatise on Ventilation, Natural and Artificial.* By Robert Ritchie, C.E. 1862. p. 232.

† *Journal of the Chemical Society.* 1863.

the amount of permanganate necessary to give a red tinge to 1 litre of the purest water. Five milligrammes of organic matter decompose 1 milligramme of permanganate, and, as each C.C. of the solution contains 1 milligramme, the amount of organic matter is at once obtained by multiplying the number of C.C. used by ·005.

Of course the varying composition of the organic matter, and the state of chemical change in which it may be, influence the result, but, at any rate, a standard of impurity is thus given which will be very useful to medical men.

Mr. Nicholson, Staff Assistant-Surgeon, has also published in the same Journal (December, 1862) an account of an improved method of analysing water by the soap test. The paper must be consulted for the details, which are too long to be given here. The plan has been partially tested by Mr. Sutton,* who has made two comparative analyses: the results in one were very accordant with those given by the balance; in the other case the agreement was not so good. The method certainly requires very great care, but, as far as can at present be said, gives accurate results, and, as it requires very little time for its performance, it seems likely, in the hands of those who will use it accurately, to be useful.

Two improved methods of making the soap solution for determining the hardness of water have been proposed. One was suggested to the writer by Mr. Hilgenberg, and consists in simply dissolving a small quantity of the soft potash soap of the Pharmacopeia in equal weights of alcohol and water. The solution, when filtered, is clear, fluid at all ordinary temperatures, and tolerably stable. After a few days' keeping there is a little deposit, and the best way is, perhaps, to keep it for some days before graduation, and when it is diluted to the proper strength to add only alcohol and not water.

The other plan of preparing a good soap solution has been suggested by Mr. Wood and Professor Redwood, and is intended to do away with the impurities contained in the common soft soap of the Pharmacopeia. The emplastrum plumbi of the Pharmacopeia, which consists of olive oil saponified with oxide of lead, is rubbed in a mortar with dried carbonate of potash (150 parts to 40); carbonate of lead and oleate of potash are formed, and the latter is dissolved by rectified spirit. By evaporation a pure and quite neutral soap is obtained. The solution is graduated in the usual way, and it is stated by Professor Redwood that it will keep for any length of time without change.†

Water as a cause of Disease.—Not much has been done during the year in tracing out the effect of impure water on health.

* *On Volumetric Analysis.* 1862.

† It may be stated, for the information of those gentlemen who have attended the Laboratory course at Fort Pitt, that if the soap solution is graduated with a solution of nitrate of baryta, containing 0·26 grammes per litre (or 18·2 grains per gallon), a solution is obtained, which can be used in a fine C.C. burette divided into tenths. 50 C.C. of water must be operated on (instead of 40 C.C., as in the old plan), and 0·2 C.C. must be deducted from the amount used, as that quantity is necessary to give a lather with 50 C.C. of the purest water. The advantage of using this graduation (suggested by Mr. Nicholson) is, that if each tenth of a cubic centimetre be called a degree, then, by simply multiplying the number of degrees used by the equivalent of the earthy salt sought to be determined, the amount per litre is obtained at once. There may be a slight difficulty at first in seeing where the decimal point has to be put, but the following rule will help:—If less than 10° (0·1 C.C. = 1°) are used, put three cyphers and a decimal point before the number of degrees, and multiply by the equivalent of the salt, whatever it may be, carbonate or sulphate of lime, &c. If more than 9, but less than 100 are used, put two cyphers and a decimal point; if more than 99° are used, put one cypher. Thus, supposing that 50 C.C. of the water under examination have taken (53° − 2°) 51° to produce a lather, and the total hardness, as expressed by carbonate of lime, is sought for, then ·0051 × 50 (equivalent of $CaOCO_2$) = 0·255 grammes per litre of carbonate of lime.

If this be multiplied by 70, the amount in grains per gallon is brought out.

In the case of carbonic acid, as one equivalent of soap combines with two equivalents of the acid, the multiplying number must be 44 instead of 22. The process of MM. Boutron and Boudet can be worked out in this way as by the old soap test. If the water be so hard that more than 80° are used, half the quantity diluted with distilled water should be operated on.

Friedelben,* who has been largely ("Canstatt Jahresb," for 1861, Band 1, p. 146, 1862) engaged in the analyses of bone, has published a full criticism on the statement made some years ago by Boussingault, that the lime salts taken in water are useful in supplying this earth for the bones. Friedelben has shown that Boussingault's figures are erroneous, and that at present this alleged use of lime salts in water can neither be affirmed nor denied.

A few observations on the propagation of typhoid fever by means of impure water are subsequently related. A good instance has been given in the American War of an outbreak of diarrhœa caused by drinking impure surface water: it ceased when wells of 20 to 30 feet deep were dug.

Dr. Knoch, of St. Petersburg, has published some interesting observations‡ on the Bothriocephalus Latus. He believes that there is no doubt the embryo (not the egg, or rarely so) is taken with the drinking water into the stomach.

"The embryos of the Bothriocephalus Latus develop their ova only after remaining months in fresh water (*i.e.* rivers and lakes); in river water, as infusorial, ciliated organisms, moving actively about by means of their cilia for several days, and finally becoming transferred in a passive way through the same medium (river water used as drink) to the human system. According to our own observations, there are two species of bothriocephalus common to man, and not a single one only, as hitherto supposed."

With regard to the two kinds or varieties—"The divisions of one are uncommonly broad from the neck to the other extremity in proportion to the length; in the other variety the breadth of the proglottidæ, in proportion to the length, is less marked."

Food.

It was expected that the International Exhibition would have been very rich in articles of food, and there were, indeed, almost innumerable specimens of produce of different countries; but there was nothing novel, and, as far as is known, no new kind of food was introduced.

Preserved Food.—For military surgeons the greatest amount of interest attaches to the preservation of food, and to the possibility of obtaining concentrated food which will require little cooking, and which, therefore, would be available for forced marches, secret expeditions, when transportation cannot be got, and other warlike conditions, which will occur to every one.

A paper previously given on "Carniset," a food of this sort prepared in Berlin, and which was sent by the Government to Fort Pitt to be tested, may be referred to as of interest in this direction. In the Exhibition there was nothing at all novel of this kind, but there were examples of two or three rather new plans of preserving food, and the following extract from the Juror's Report will be found to give a good account of them:—

"*Preserved Meats.*

"Very little improvement has been made in this branch of industry since the Exhibition of 1851, notwithstanding the importance of it, and the large increase of its trade. Most of the meat is over-done, and is loaded with fat, and in many cases the food had acquired a metallic flavour from the vessel in which it was preserved.

"As in 1851, the principal mode of preserving the meat is by the exclusion of atmospheric air. This is accomplished by first filling the case with the meat or soup, then soldering down the cover, which has a small aperture in it for the exit of steam. The cases are then stood in a saline bath, or upon a hot plate, until the liquid within them boils freely and expels the contained air. While thus boiling, and steam is freely issuing from the minute orifice in the cover, the hole is stopped with solder, and so the case is hermetically sealed. By this process the meat is generally over-done; it loses its fresh flavour, and becomes sodden and broken up; besides which, on the cooling of the case, the steam within it condenses, and there is a constant vacuum and liability to indent and buckle from atmospheric pressure. A trace, also, of air frequently remains within the case, and thus the oxygen slowly, but surely, sets in putrefactive decomposition. To remedy these defects two improvements have been suggested. One of these was patented by Messrs. John McCall and Co., of

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* *Petersb. Med. Zeits.*, 1861; noticed in the *Lancet*, Jan. 1862; and given in *Virchow's Archiv.* Band xxiv. p. 453.

Houndsditch, in 1861. It consists in the introduction into the tin of a small quantity of the sulphite of soda. The proportion used is about twelve grains to each pound of meat. The effect of this salt is to absorb from the meat and the air of the case the small proportion of free oxygen which, under the best of circumstances, often remains within it. In order that the sulphite of soda shall be isolated until the air is expelled and the case soldered down, the salt is enclosed in a tin capsule soldered to the inside of the top of the canister. The capsule has two holes in it, plugged with fusible metal, which melts at a few degrees above the temperature of boiling water (about 218°). As soon as the steaming hole is closed, and the temperature raised by the steam pressure within, the fusible metal melts and releases the sulphite of soda within the capsule. It is presumed that the effect of this improvement will be the doing away with the necessity for the prolonged steaming of the food before the cases are soldered down, and thus the prevention of that over-cooking which has hitherto been so objectionable. In the case of soups, the salt is not always enclosed in a cap, but is put into the soup.

"The other improvement is a process of Messrs. Jones and Trevethick, of Botolph Lane. It provides for the preservation of food in the raw state, without the disadvantage which all preceding processes have of maintaining a vacuum within the case. The process is conducted in the following way:—The meat is wrapped up in a piece of cloth, and is enclosed in a tin case; the cover of the case is then soldered down. From the top of the case there projects a short tube, which is brought into connection with the exhausting power of an air-pump: a very ingenious contrivance is adopted, whereby the tin cases are protected from external pressure during exhaustion. This is accomplished by placing the tins in an air-tight vessel filled with water, the elastic property of which supports the sides of the case, and prevents the slightest collapse. When the air has been exhausted from the tins, a charge of pure nitrogen is let into them. This also is exhausted, and then a minute dose of gaseous sulphurous acid is introduced. Finally, another charge of nitrogen is let in, and the vessels are permanently soldered down. The effect of the sulphurous acid is to combine with the minute trace of oxygen which remains in the case, and the nitrogen, by filling the case, prevents collapse from atmospheric pressure. The nitrogen is obtained pure from atmospheric air by a simple chemical process which absorbs the oxygen. Mutton, beef, hams, fish, poultry, and game were exhibited preserved in this way, and the results were remarkably successful and satisfactory. The poultry and game had the appearance of having been but an hour or two from the poulterer's. The ham and bacon were as good after many years' keeping as if they had been just cured; and, although the fresh meat had acquired a rather bright red tint from the action of the gases upon the flesh, yet the flavour was decidedly superior to that of any other kind of preserved meat. The process offers a promise of great economic value."

A process somewhat similar to these has been lately described by Polli.* He has also recalled attention to the very powerful preservative effect of sulphurous acid. The meat is placed in a vessel of convenient size, and suspended over water; sulphur is then burnt in the vessel, which is hermetically closed. The burning of sulphur must be repeated every day at first, and then every two or three days. When the meat is to be used, it must be washed, and then exposed to the air for a short time. The sulphites of the alkalies are less useful, as the meat has to be longer washed, and thus loses some of its salts.

Milk can be preserved in the same way. If it is mixed with one-thirtieth part of its volume of solution of sulphurous acid, it is said to remain fluid for months, and fresh even in summer.

Adulteration of Food.—It would appear that adulteration of food has lessened during the ten years from 1851 to 1861, probably owing to the great attention directed to the point, and to the easy mode of examination given by the microscope. The greatest improvement has taken place in pickles and confectionery.

Pickles are much freer from copper, and the confectionery of the best makers is now tolerably pure. The following extract from the Juror's Report may be interesting:—

"*Confectionery and Sweetmeats.*

"In a very conspicuous place in the Eastern Annex there is a case of Dr. Hassall's, which represents, as far as confectionery is concerned, the various kinds of adulteration

* *Annali Univers de Medic.*, quoted by Birkmeyer in *Canstatt*, for 1861. Book vii., p. 52. 1862.

which were practised about the time of the first Exhibition. Every comfit and bonbon contains an amount of impurity which would shut them out from the market at the present time—chalk, plaster of Paris, flour, and poisonous pigments abound in the composition of most of them. A glance, however, at the confectionery which is exhibited in the neighbourhood of this case, will show how great has been the improvement of its manufacture. And not only has there been a large improvement in the quality of the goods, but there has also been a large increase in the quantity of them produced. No longer ago than the year 1855, the total amount of confectionery made in this country did not exceed 8,000 tons in the year, whereas at the present time the quantity is not less than 25,000 tons per annum. One house alone, as we are informed, is making about two-and-a-half tons of lozenges and comfits per day, besides about fifty tons of marmalade, and sixty of jams, in the course of the year."

c. Diseases produced by Bad Quality of Food.—Circumstances have led to a good deal of discussion during the year, on the effects produced by meat taken from diseased animals, but not actually decomposing. A proposition was made to exclude from the London market the meat of diseased animals, whatever the affection might have been; but it was found that this would have the effect of bearing very hardly on the poor, who obtain at a lower price meat of this description. Before entering on an action of this kind it was felt to be desirable to estimate precisely the nature of the evidence proving the production of disease from this cause. The available evidence was found to be very limited and defective, and the Metropolitan Officers of Health have therefore appointed a Committee to examine the point, and probably the result of their investigation will be available for next year's Report.

Dr. William Budd* has commenced a series of very important papers on a part of this subject, viz., on the production of malignant pustule in men, arising, it is inferred, from inoculation during the use of meat taken from animals who have died of the disease. The general result is to show that malignant pustule in men is not uncommon in this country, and that it is marked by most precise and definite symptoms, symptoms so certain as to identify it beyond a doubt with the "charbon" of cattle, and which are thus detailed by Dr. Budd:—

"The commencement of the disease in an affection resembling the bite of a gnat, and at first sight not at all more serious in outward seeming; the importunate itching, or the equally characteristic stinging and burning of the early stage; the formation within a few hours of the well known vesicle; the hardening, blackening, and death (the "mummification," as the French and Germans express it) of the texture immediately around it (hardening so extreme, and death so entire, that in more than one instance the knife of the surgeon creaked in the flesh, inflicted no pain, and gave issue to no blood); the diffuse and erysipelatous swelling of the larger area, the crop of sedentery vesicles, the chains of inflamed lymphatics, the fœtor of the breath, and, lastly, death amid all the indications of septic poisoning, were incidents common to all. Taken in their whole succession, it may be safely affirmed that there are incidents which are diagnostic of malignant pustule, and belong to no other malady.

There is very little or no pain in the disease, and there is no formation of pus—two negative signs of importance.

The exact similarity of this disease with the charbon of cattle certainly does lead to the idea that it may be derived from animals thus affected, but direct evidence is still rather deficient. In the majority of Dr. Budd's cases the disease was not recognised in time for a proper enquiry to be instituted. In two cases the disease "undoubtedly followed the bite of a fly, and occurred in the seat of the puncture." Dr. Budd believes that insects feeding on the diseased meat may thus carry the poison, and quotes a sentence from Virchow to the effect that flies may, without biting, "implant the poison by their soiled wings and feet."

Certainly there must have been an inoculation of some kind in these cases, though direct evidence of its origin and nature is quite wanting.

Dr. Budd also states that the temperature of boiling water does not destroy these animal poisons.†

* *British Medical Journal.* January and February, 1863.

† It may be well to give some of the synonymes of the "malignant pustule;" morbus carbuncularis, anthrax, typhus carbunculosus, pustula maligna, pustula livida, pustula gangrœnosa, carbunculus contageosus, milzbrand, karbunkel-kraukheit,

During the year 1862 the subject of the propagation and changes of the Entozoa, which has been so singularly explained of late years, has received additional illustration.

A great work has been commenced by Leuckardt,* of which the first two parts only have appeared.

The most interesting part of the volume is the description of the Tænia mediocanellata, which Leuckardt has shown to be very common, and which he thinks is not derived from the pig, like the Tænia solium, but from the ox. It would seem that the chief tape-worm of Abyssinia is the Tænia mediocanellata, and not the Tænia solium, as formerly supposed; and it is very interesting to find that M. Cornbon† has, without knowing Leuckardt's observations, stated that the habit of eating *raw beef* is the cause of the prevalence in Abyssinia.

In last year's Report the singular febrile disease supposed to be produced by the wanderings of the young trichinæ was mentioned. The last year has seen some remarkable examples of this newly-recognised "trichina disease," which appears to be caused especially by eating pork infested with the trichina spiralis.

A singular outbreak of this affection, affecting 25 to 30 persons, has occurred at Planen, in Saxony.‡ In three patients little portions of the muscle from the upper arm were taken, and under the microscope living and very active trichinæ were seen. The symptoms of the disease were depression for many days, followed then by extraordinary pains in the limbs, swelling of the face, and fever. After two or three weeks the symptoms in the slighter cases gradually disappeared; in the severer cases there was general and painful swelling. Only one case in sixteen died: it was dissected by Zenker, and free and encapsuled trichinæ were found in abundance.

An extremely remarkable case has also been recorded by Dr. Friedreich, of Heidelberg.§ The patient was a butcher, who was admitted with a train of symptoms which led Friedreich at once to suspect the nature of the disease. There was considerable fever and diarrhœa, and so far the disease slightly resembled typhoid; but there were singular and excessive muscular pains almost everywhere, especially in the calves of the legs, which were hard and elastic, with a feel almost of India-rubber. So severe were the pains that the patient could not sit up in bed; at a later period there was contraction of one biceps; there was also hoarseness. After continuing for some days without much change, a pustular and furunculoid affection appeared, and swelling of the lower limbs. There was throughout profuse sweating.

The joints were quite free, and this negatived the diagnosis of rheumatic fever.

The patient, who was treated with the picro-nitrate of potash, slowly recovered.

The muscles (calves of the legs) were *harpooned* several times. The first time was about twenty or twenty-one days after the commencement of the attack; although only a piece of muscle about the size of a hemp-seed was

charbon malin, pustule maligne, puce maligne. Carbunculus hungaricus and pemphigus hungaricus are names, which have been given from its local prevalence. A great number of works have been published abroad on this subject. Virchow, in a short bibliography, gives the titles of 16, the earliest of which was written in 1769, by Fournier, of Dijon. In this country the disease has, till lately, either been infrequent, or has been overlooked. At present it does not appear to be uncommon.

It must be remembered, however, that affections extremely like the malignant pustule can certainly arise in men independent of the diseased meat of animals dying of "charbon;" sometimes these are, owing to other animal poisons, such as pus or fluids from vesicles, and sometimes no cause can be traced. Also, it must be remarked, that Neffell has lately asserted that the Kirghis Tartars eat without injury the flesh of cattle dying of charbon, and that Renault (quoted by Payen) has affirmed that no bad effect can be traced to the use of meat taken from animals with any contagious disease.

* *Die Menschlichen Parasiten von Dr. Rudolf Leuckardt.* Leipsig, 1862.

† *Observations topographiques et Médicales recueillies dans un voyage a l'isthme de Suez.* Paris, 1861.

‡ *Schmidt's Jahrb.* 1862. No. 7, p. 142.

§ *Virchow's Archiv. für path. Anat.* 1862. Band xxv. p. 399.

taken out, no less than seven trichinæ were found. Ten days later other harpooning showed no trichinæ; but seven days after this a living, but not encapsuled, trichinæ was found; and four days after this an encapsuled worm was discovered. Seventeen days later, when the patient was quite well, the search for trichinæ was fruitless.

The muscular fibres were not inflamed, but were fattily degenerating rapidly.

A very extraordinary discovery was that a trichina was found in the pus of one of the boils, so that Friedreich asserts that the furunculoid disease was caused also by a wandering of the worm beyond its usual site.

The patient had been engaged killing pigs the week before his illness, and had often held his bloody knife in his mouth, and had also eaten raw some of the bits intended for sausages.

Another outbreak, apparently of the same kind, has occurred in Magdeburg,* and has prevailed during five summers, but was at first not recognised. The chief symptoms were the fever, the severe pains, and the swelling of the lower limbs, which caused the disease to be called, at first, "scleroma adultorum." All the circumstances indicated the trichina disease; but the animal was not sought for.

Another instance has been recorded by G. Simon and Herbet, and has been mentioned by Meissner. In a small town of 1,200 persons, 38 persons were attacked (or 3 per cent. of the population), and 8 persons died, with symptoms so striking as to lead to a diagnosis of trichina disease. In one dissection (the only case dissected), the trichinæ were found in innumerable numbers. It was found that all the inhabitants obtained their meat from one butcher, who, with his wife and daughter, was himself attacked by the disease. Of the 38 persons, no less than 36 were known to have eaten pork—in seven cases raw, in the others lightly cooked. In two cases it was denied that pork had been taken. The symptoms were similar to those already noted; and, looking to all the circumstances of the case, the feeding on the same food, the similarity of the symptoms, the proved existence of the innumerable trichinæ, in one case at least (the only case properly investigated), there can remain no doubt that this was an outbreak of the "trichina disease."

In fact, it seems quite certain that a new febrile disease must be admitted into our nosology, and another slice is taken off from the heterogenous group of "continued fevers."

It seems quite clear that the trichina is not killed by putrefaction of the pork, or by freezing it, or by salting. It does not seem yet certain whether smoking kills the trichina as completely as it does the cysticercus; certainly many are killed, and, if the process is continued long enough, perhaps all.

Sewers and Deodorisation.

Three important works have been published in 1862, viz., Two Reports of the Committee of the House of Commons (Dr. Brady's)† appointed to enquire into the question of Sewage; and the Second Report of the Commission,‡ of which Lord Essex is the president, and which is engaged in investigating the subject on a very large scale.

All that is known of the effect of sewage applied to land may be gathered from these books.

Disposal of Sewage.—The Commission have very strongly reported against the practice of discharging sewage into running streams. Not only is there danger of the contamination of the drinking water, but it is found that so great is the deposit that the channels of rivers are becoming clogged. Even the bed of the Mersey is becoming raised. In Glasgow 8,000*l.* are spent yearly in removing the sewage deposits from the Clyde; at Bath the Avon is becoming clogged; and the streams in Birmingham, where 25,000 tons per annum of solid deposit are now arrested, have permanently silted up their beds some

* *Meissner in Schmidt's Jahrb.*, 1863. No. 1, p. 50 and p. 51.

† *Parl. Paper.* Ordered to be printed, April and July, 1862.

‡ *Second Report of the Commission appointed to enquire into the best mode of Distributing the Sewage of Towns.* Bluebook, 1861.

four feet, with great damage to property. In some way or other it has become imperative to dispose otherwise of the sewage, apart altogether from the agricultural part of the question.

The Commissioners state that in about thirty towns in England means are now taken for dealing with sewage before its discharge into rivers and streams. In most cases the chief aim has been to separate the solid matter by rest and mechanical means, rather than by chemical agency. Mechanical means often fail; sand-filters become clogged and inoperative immediately. At Rugby, after a trial of three years, they have been discontinued. Upward and downward filtration have been tried at Birmingham with indifferent success. The simplest plan seems the best, and that adopted at Worksop is a good one. The first cost for a population of 7,000 was only 530*l.*, and the current expenses are merely one-halfpenny per head yearly. The works consist of a series of parallel open trenches, having a section area ten times as large as that of the outlet sewer; the sewage circulates, therefore, very slowly, and the greater part of the solid matter is deposited. Moveable hurdle or wicker-work strainers are placed across the trenches for intercepting the lighter portions; lime is used to deodorise when necessary. If desirable such trenches can be covered. At Uxbridge lump charcoal, and at Bilston furnace clinkers, are used for straining the sewage. At Coventry and Chelmsford the deposited matter is taken from the tanks, is mixed with town sweepings, or with tan and other dry refuse, and find a ready sale; it is not, however, remunerative. At Carlisle Mr. McDougal has taken a lease of the sewage, and deodorises it with his crude carbolic acid, and then applies it to land.

In certain cases, when the thinner part of the sewage can be applied to grass land in very large quantities,* and in an economical manner by gravitation, the results have been extremely favourable. It does not appear to be so well adapted for arable land; a small quantity of grass will take a very large quantity of sewage, and deodorises it so rapidly that no odour can be perceived; there is, however, a limit to this.

In some cases towns have hired meadows for the sole purpose of spreading the thin part of the sewage over them, and thus getting rid of it; in other cases, after the subsidence of the thicker part, the fluid is allowed to flow into streams.

A "dry method" has been used for almost two years by the "Patent Eureka Sanitary and Manure Company,"† which is somewhat similar in principle to that employed at Ferozepore and other towns in India. About 180 cottages at Hyde, in Cheshire, have been under the system for two years. Instead of the old ashpit and cesspool, a barrel or tub is used, in which all the ashes and the refuse of the cottage are placed. Under the seat is a drawer, which is sprinkled with a deodorant, said to be so efficient that even when the drawer is full there is no smell. All the urine of the cottage is put into this drawer, but no slops. At certain intervals (about every two months) a van visits each cottage, the drawer is removed, fitted with a lid, replaced by an empty drawer, and taken to the works; here all the sewage is put into a large tank, treated chemically to prevent the escape of the ammonia, and then steam heat is applied in proper boilers, so that the bulk is reduced to less than one-seventh. It is then mixed with very fine calcined ashes, and forms a portable, and, it is said, profitable manure.

The whole town of Hyde is about to be treated in the same way, and, if it be true that decomposition of sewage is so entirely prevented, and that the result is profitable, we shall see a large extension of this method in our small towns. It is of course necessary to be cautious in dealing with the statements of those who have projected and are carrying out this plan, but it is only fair to state that the Inspectors of Nuisances at Hyde have reported (p. 91) very favourably indeed of it.

It does not appear that the application of the sewerage to land, though it sometimes causes a nuisance, has been productive of disease; probably the

* On the Craigentinny meadows, near Edinburgh, where the average value of a grass crop is from 20*l.* to 30*l.* per annum, the sewage derived from a population of 80,000 is spread over only 325 imperial acres.

† *Second Report of the House of Commons Committee*, p. 18, *et seq.*

greedy absorption by the ground is so great, as to do away with much risk from this source, but certainly the point requires to be carefully watched.

Composition of Sewage.—A good many analyses of sewage water are given in these various publications. I have selected four from Mr. Way's evidence (Second Report of Commission, p. 69, et seq.), as samples of the usual composition.

	Grains per Gallon.			
	1	2	3	4
Organic matter { Soluble	19·40	41·03	12·3	9·20
Organic matter { Suspended	39·10	17·	24·37	
Lime	10·13	14·71	12·52	11·25
Magnesia	1·42	1·82	1·59	1·35
Soda	4·01	2·40	2·41	1·89
Potash	3·66	3·57	3·31	1·09
Chloride of Sodium	26·40	22·61	34·30	5·58
Sulphuric Acid	5·34	5·31	6·40	3·43
Phosphoric Acid	2·63	5·76	2·48	0·64
Carbonic Acid	9·01	8·92	11·76	4·77
Silica, Oxide of Iron	6·20	13·55		..
Ammonia	7·48	8·43	7·88	

List of Deodorants employed.—The Commission give a list of deodorants, and an account of their action, which it may be useful to condense.

1. Quicklime and water added till a deposit occurs, leaving a clear fluid above. This is chiefly caused by the lime forming insoluble salts, by union with carbonic and phosphoric acids, and mechanically carrying down the suspended matters. The sulphuretted hydrogen forms sulphuret of calcium, which remains in the supernatant fluid. The ammonia is set free. The potash salts remain in the liquid. Five-sixths of the phosphoric acid are in the precipitate. No organic matter is precipitated except mechanically. The solid deposit has little value as manure. The lime delays, but does not prevent the subsequent decomposition of the animal vegetable matters, and as the sulphuret of calcium easily decomposes, sulphuretted hydrogen is very liable to be again set free from the clear fluid.

The process, though simple and cheap, is by no means perfect. The addition of charcoal to the lime does not materially modify the result.

From 15 to 16 grains per gallon of quicklime are enough for 1 gallon of sewage, or 20 cwt. per million gallons.

2. Cheap salts of alumina, and thin lime, or zinc and charcoal (Stothert's process).

The alumina precipitated by the lime forms a very bulky precipitate, well suited to the entanglement of suspended matters. The clearance of the sewage is more perfect than with lime alone, but otherwise the process and the objections are the same, and the cost is greater. The whole of the phosphoric acid is precipitated as phosphate of alumina. To a gallon of sewage were added 73½ grains of sulphate of alumina, 3½ grains of sulphate of zinc, 73½ grains of charcoal, 16¾ grains of quicklime.

3. Superphosphate of magnesia, and lime water (Blyth's patent). The idea was to add a substance, which, in addition to deodorizing, might be useful as a manure, and it was thought that a double phosphate of magnesia and ammonia would be thrown down; but this salt is sufficiently soluble in water, especially when it contains chloride of sodium, to render this expectation incorrect. This method has been practically found to be useless, and to be more costly than any other plan.

4. Sulphites of lime and magnesia, mixed with products from tar (carbolic acid, &c.) The fermentation is supposed to be arrested by both classes of substances. The sulphites destroy sulphuretted hydrogen; their action, however, is transient, and they themselves are very liable to change; the tarry products have a comparatively limited action; they have some influence, but they rather mask the odour, than absolutely prevent decomposition. The sewage is not precipitated by this process. This is a lime process with improvements, but with greater expense.

5. Perchloride of iron. When this salt is added to sewage, a precipitate of peroxide of iron is caused by the carbonate of ammonia, which forms so rapidly in sewage, and carries with it all the suspended matters of the sewage. A clear fluid remains above. The sulphuretted hydrogen falls in the precipitate as sulphuret of iron.

Both precipitate and supernatant liquid are free from odour.

This is the "best practicable precipitant" of sewage. It has been tried at Croydon and Coventry. From 14 to 29 grains per gallon of sewage are necessary for London sewage; for Croydon sewage from 5 to 15 grains were necessary.

The perchlorides of iron can be manufactured by dissolving peroxide of iron in hydrochloric acid; the different iron ores, refuse oxide of iron, from sulphuric acid works, iron rust in foundries, &c. Another plan is to take equivalent proportions of common salt, sulphuric acid, iron rust, and water, so that chlorine, when disengaged, shall combine with the iron. A hard, yellowish material, not very deliquescent substance, containing 26 per cent. of perchloride of iron, is formed, which can be transported to any distance. The price, "if made in this way, is 2*l.* 7*s.* per ton (cost of labour not included).

The above is an abstract of the Commissioners' conclusions and Mr. Way's statements. The perchloride of iron is ranked as highly as it formerly was by Hofmann and Frankland. M'Dougall's powder and fluid (carbolic acid) are, however, probably underrated.

Spread of the Specific Diseases.

The question in etiology which is perhaps of all others the most immediately interesting, viz., the conditions of origin, and spread of the specific diseases, has been discussed by Dr. Murchison in a work which it is not too much to say is one of the best, if not the very best, which has ever been published on the Continued Fevers* of this country. Dr. Murchison is one of the strongest advocates for the spontaneous origin of typhus and typhoid, or enteric, or, as he terms it, pythogenic fever, and his work was therefore looked to with the greatest interest, to see what positive evidence he could bring in support of his views. A brief statement of his argument may be useful to those who cannot procure the work.

Typhus.—That the spread of typhus is intimately connected with overcrowding, and can be very easily arrested by free ventilation, has long been known. Dr. Murchison, in the first instance, proves that typhus is contagious, a fact few will now dispute; then that it is communicated through the cutaneous and pulmonary exhalations, and inhaled or perhaps swallowed; that it is transmitted to a small distance only through the air (perhaps from the ease with which it is oxidized); that it can be communicated by fomites in clothes (a fact of which the writer of this Report has seen a striking and apparently quite certain instance); that if the poison be concentrated, exposure for a few minutes only may produce the disease; that its latent period is from a few hours to about twelve days, but is perhaps usually about nine days, and that it is probably most contagious from the end of the first week to convalescence, viz., during the time when the odour from the skin is strongest. He also notices the statements that the poison is lighter than atmospheric air, and ascends (a difficult thing to prove), and that it is destroyed by a heat of 204° Fahrenheit (Henry). Having discussed these points with great care and acuteness, Dr. Murchison argues that typhus can spontaneously originate from great overcrowding and deficient ventilation, and he proceeds to cite instances which he has collected, and instances he has observed. Of the former he cites five instances, in all of which there was prevalence of the disease under such conditions of overcrowding, without decided evidence of importation. All these cases, however, are weak as respects the negative evidence, of the absence of importation.

The groups of cases observed by himself are three in number; in all he examined for a source of contagion, but could find none; in all the conditions

* *A Treatise on the Continued Fevers of Great Britain.* By Charles Murchison, M.D. London: 1862. Pp. 638.

of overcrowding and of a fœtid and putrid air existed in the highest intensity. These instances are certainly the strongest which have ever been brought forward; but it must be remembered that they are very few in number, and that in London the difficulty of tracing the introduction of a contagion is extreme. Dozens, nay, even hundreds of such cases, with perfect negative evidence as to non-importation, would be necessary to carry conviction on this point. It seems impossible to deny that Dr. Murchison's cases are forcible; that they are not convincing will be perhaps a general opinion. Reference is next made to outbreaks of jail, ship, and military typhus; but it must be remembered that in jails, till the time of Howard, jail fever was never absent, and that in the case of ships there is, again, an extreme difficulty in excluding importation. In the cases of military fever, the outbreak in the Crimea is alluded to, and it is stated that there is no evidence "that it was imported," but typhus was prevailing among the Turks during the whole period of the war, and there must have been plenty of poison carried by the Turkish corps serving with the Allies. No stress can be laid on this case. In the other instances referred to, the typhus of Dantzic, in 1813, was merely an offshoot of the typhus which prevailed in all the armies in 1812 (and, indeed, more or less in all the Napoleonic wars), and it can hardly be cited as an instance of spontaneous origin; and this may be said, also, of the typhus at Torgau, in 1813.

On the whole, while it is undoubted that typhus spreads and devastates only in overcrowded and ill-ventilated places, we cannot but believe that much more evidence is necessary to prove its origin in that way. The accessory conditions which assist its spread are depicted very truly and vigorously by Dr. Murchison.

Typhoid or Enteric Fever.—Dr. Murchison's evidence of the spontaneous origin of typhoid fever from fœcal decomposition is stronger than in the analogous case of typhus. He has assembled thirteen cases in which outbreaks of typhoid fever occurred in connection with sewage exhalations; if any doubt had previously existed on this point, this series of crucial instances would have removed it. Subsequently Dr. Murchison proceeds to argue the question whether any kind of fœcal decomposition will produce the disease, or whether, as strongly urged by Dr. William Budd, the evacuations of patients ill with typhoid fever must have passed into the sewers or cesspools. He points out, first, that in some cases, when typhoid fever arose from drains, there is no evidence of the entrance of typhoid stools; second, that there are cases of outbreaks "from bad drainage," where it is impossible to conceive that the poison was introduced into the drain, and he cites the cases of the Peckham Police Station, Westminster, Clapham, and Colchester (in which last place, especially, "every possibility of importation appears to have been excluded"), and country places known to him, or to persons furnishing information to him.

He then refers to the negative instances of persons not contracting typhoid fever when exposed to different animal, and even sewer vapours, and refers to the quoted instances given by Parent Du Chatelet and Guy, of the non-prevalence of typhoid fever among sewer and night-men. He points out the imperfections of both these inquiries, which he justly regards as of small value, and then refers to observations of Peacock and himself, that "enteric fever is not uncommon among the workers in sewers."

He then shows that many of the statements formerly made cannot be received, in consequence of the distinction between typhus and typhoid fever not being known.

Such is the sketch of the argument, which is well worked out, but which appears to us deficient in one or two points. Dr. Murchison does not allude to cases in which small villages, unsewered, and apparently the very places of election for typhoid fever, have for years remained free, although at some time all requisite conditions of temperature, humidity, &c., must have been present. Then, at last, a person enters who has typhoid fever, and from this source the hitherto healthy village becomes infected. Again, he seems to pass by much too lightly the positive evidence that the typhoid stools will excite the fever, a fact of which there is no doubt, and in all his negative instances he does not refer to the very great difficulty in this case, as in the case of typhus, of

proving a negative. On the whole, it seems very doubtful whether the profession will consider his case to be made out. Certainly it must be conceded that more evidence, and a stricter inquiry, are still necessary.

Dr. Murchison alludes to and admits the occasional propagation of typhoid fever by drinking water. This appears to us one of the most important points lately discovered in etiology. Riecke* quoted, more than twelve years ago, two or three instances of this kind, and a considerable number of cases are now on record.

Although many of these cases are not very perfectly recorded, it has appeared to the writer that these points can be tolerably clearly made out—first, that a much larger number of persons are attacked than when the disease is communicated, as it usually is, through the air; and secondly, that the period of incubation is much shortened, and that the succeeding fever is more severe. Probably in this way a larger amount of the poison is swallowed, and either absorbed into the blood, or what appears more likely, applied to a greater extent of the agminated glands than when the poison is drawn in with the air, and then swallowed. The great effect of impure water in this way does, indeed, tend to show that the changes in Peyer's patches may be the very first conditions which precede the general fever, and possibly even cause it.

Whatever opinions may be finally come to, every year's experience is bringing out more clearly the paramount importance of properly disposing of the typhoid stools; they should on no account pass into sewers or cesspools, but should be mixed with disinfectants, and then buried.

Relapsing Fever.—Dr. Murchison fully admits the contagion of relapsing fever, but also believes it can be spontaneously generated, and that its grand causes are, as in the case of typhus, destitution and overcrowding. There can be no doubt of the intimate connection between starvation and relapsing fever, but it must be confessed that the production of relapsing fever is very obscure.

On the whole, this very able book seems to leave the question of the spontaneous origin of these specific diseases very much where it was; if anything, Dr. Murchison's instances and arguments in favour of origin, *de novo*, are less complete than might have been anticipated.

Straw Measles.—A very extraordinary statement has been made by an American physician, Dr. Salisbury,† that an attack of a disease closely resembling measles, and attended with catarrhal symptoms, and with red blotches on the skin, was produced in the camp at Newark by apparently the dust of decayed straw, containing fungi in abundance.

Dr. Salisbury inoculated himself and his wife with the spores and cells of the fungi of wheat straw, and produced in both a disease which he states he could not distinguish from measles; the same result was given in thirteen other cases. The disease appears in from twenty-four to ninety-six hours after the inhalation of the fungi. It is to be hoped that so easy an experiment will soon be repeated.

Statistical Inquiries especially connected with Hygiene.

It is impossible to give any analysis of the vast number of statistical papers which are published every year. Two essays only, published in 1862, may be mentioned here, first, the Vital Statistics of Sweden, which show the condition of a northern population thinly scattered over the country, and not congregated into towns, and second, an Inquiry into the Action of Malaria on the Duration of Life, which, both by its method and its exactness, is an important essay.

Vital Statistics of Sweden.‡—These are drawn, from records kept since 1749, with great care. The following are merely a few of the points noted:—

* *Der Kriegs-und Friedens-Typhus in den Armeen.* Von D. C. F. Riecke. Nordhausen, 1850. Pp. 44.

† *American Journal of Medical Science, and American Medical Times.* September 6th, 1862. Pp. 133.

‡ Hendriks, in the *Statistical Journal*, June 1862. Vol. xxv. Pp. 111.

Years from which the Average is drawn.	Expectation of Life at Birth in Years in Sweden.	
	Males.	Females.
1755–75	33·88	36·60
1776–95	34·74	37·54
1816–40	39·50	43·56
1841–55	41·28	45·60

In England the expectation of life at birth is about 40·36 years, in males, and 42·04 in females. It will be seen that in Sweden the expectation of life has regularly increased. This is partly owing to the lessening of the excessive *infant* mortality of the earlier period, and partly to the removal of the great scourge of small-pox.

The expectation of life in Sweden, based on the years 1841–55, may be compared with the English life Table of 1841.

Ages.	Male.		Female.	
	Swedish.	English.	Swedish.	English.
0 (or at birth) ..	41·28	40·17	45·60	42·16
1 year	48·29	46·72	51·95	47·55
2 years	49·27	48·82	52·92	49·57
5 „	49·4	49·64	52·96	50·37
10 „	46·48	47·08	49·99	47·81
20 „	38·55	39·88	42·12	40·80
30 „	31·22	33·13	34·45	34·24
40 „	24·33	26·57	27·21	27·72
50 „	18·02	20·03	20·11	21·07
60 „	12·31	13·59	13·48	14·39
70 „	7·40	8·52	8·04	9·01
75 „	5·47	6·55	5·99	6·91
80 „	3·80	4·94	4·32	5·19
90 „	2·42	2·73	2·76	2·83

It is thus seen, that up to the age of 10 in males, and 30 in females, the expectation of life is a little higher in Sweden; after those ages, in England. The numbers certainly point to a very large mortality among children in England, as the chief cause of this.

The density of the population in Sweden was, in 1858, 465 persons to the square mile; in England, in 1861, it was 5,027. The population is chiefly rural, viz., 1,000 to every 116 living in towns, and even the towns are small.

In 1751 there were 1,124 females to 1,000 males.
In 1855 „ 1,063 „ „

So that the disproportion of the sexes has lessened of late years.

Marriages have become rather fewer; in 1751–60 there was 1 marriage to 110 inhabitants; in 1851–55 there was 1 marriage to 136 inhabitants. In England, the proportion in 1849 was 1 marriage to 119 inhabitants.

As to births; in 1751–75, there was 1 birth to 29·09 of the population; in 1816–55, to every 30·87 of the population.

The average number of children to a family was 3·99 (average of 1751–1855). The highest average number was 4·51 (in 1836–40), and the lowest, 3·57 (in 1806–10).

There were 105 male births to 100 females (still born included), being rather less than in Norway, less than in France, Austria, and Holland, and nearly the same as in England and Scotland.

The deaths in the years 1751–1855 were as follows:—

Inhabitants to 1 death .. .. (In England it is about 45).	= 39·9
Deaths to 100 inhabitants .. .. (In England 2·2).	= 2·5
Children born alive to 100 deaths	=130
Deaths of females to 100 deaths of males	= 98·49

The highest mortality was in 1806–10, viz., 30·7 per 1,000, and the least was in 1854, viz., 19·8 per 1,000.

Very full details are given on all these points in the paper; enough has been here quoted to enable us to say that at present England, with all the disadvantages of her large towns, does not contrast unfavourably with Sweden; probably our advantage is to be found in the wealth, and on the whole, good food of the population.

Effect of Malaria on the Duration of Life.—An accurate essay by Dr. Reinhard* has materially contributed to a more complete knowledge of the influence exerted by marsh regions on the health of inhabitants. The facts are derived by comparing the marshy district of Bautzen, in Saxony, which is watered by the Spree, and presents all the characters of a low, moist, marshy, alluvial land, with the comparatively elevated neighbouring districts, which are entirely free from malaria. In both districts, the nationality, kind of life, and customs, are the same, so that an accurate comparison is possible. The figures are drawn from the death lists during 20 years (1840–1859) of 24 villages in the low lands, and 68 villages in the high lands. The census of 1849 gave 4,814 inhabitants to the 24 marshy villages, and 7,749 inhabitants to the 68 hill villages.

In the 20 years, 2,720 persons died in the marsh district, and 146 children were dead born. In the same time, 3,225 persons died in the hill district, and 164 children were dead born.

The yearly mortality was therefore—

1 Death to 46 Inhabitants of the Hill District.
1 „ 33·6 „ „ Marshy District.

Or, in other words, the mortality per 1,000 per annum was (including the dead born) 21·8 in the first, and 29·8 in the second case. In the case of the Department de l'Ain, referred to in Quetelet (T. i. p. 158), the mortality was 1 in 38·3 in the Jura hills, and 1 in 20·8 in the marsh regions, which were probably more extensive than in the Bautzen district.

The mean duration of life does not, however, show the difference between the hill and marshy districts, which might be expected. It was in the hill country 31·1 years, and in the moist region 30·6 years. The cause of this is evident, from the following Table:—

Ages.	In every 1,000 Deaths.	
	Hill Districts.	Marsh Districts.
0— 1 year	348	312
1— 6 „	107	115
6—14 „	25	21
14—20 „	12	15
20—30 „	34	42
30—40 „	40	51
40—50 „	60	81
50—60 „	87	105
60—70 „	126	132
70—80 „	127	93
80—90 „	32	22
Over 90 „	2	1

* Pappenheim's *Beiträge*. 1862. Heft iii. p. 10.

It is therefore evident that the mortality among children under 1 year old was greater in the hill districts, a fact which seems to have a general application, or at any rate to be frequently true. After the age of 1 year, however, the mortality in the marsh districts was (with one exception) greater at every age up to 70, and was most marked between 40 and 60. But the slighter degree of mortality among the children under 1 year old of the low district increases the calculated mean duration of life of the entire community; so that, expressed in gross, the mean duration of life is here, as in so many cases, no good criterion of the health of a people.

If the mean duration be divided into classes, according to age, the bad effects of marsh districts becomes, however, at once apparent.

The Mean duration of Life was		Hill Districts.	Marsh Districts.
For all who were born ..		31·1 years	30·6 years
For those who survived	1 year.. ..	47·5 „	44·5 „
	6 „	56·4 „	52·9 „
	14 „	58·6 „	55·3 „
	20 „	59·6 „	56·4 „
	30 „	62·1 „	59·2 „
	40 „	64·6 „	62· „
	50 „	67·8 „	65·9 „
	60 „	71·7 „	70·5 „
	70 „	77·0 „	77·0 „

After the age of 1 year it is therefore seen that the mean duration of life was lower at every age in the marsh district till 70, when the numbers are too small to be trustworthy. The greatest difference is at 6 years, when the mean duration of life is nearly 3½ years less in the marshes than among the hills.

It may, however, be argued, that if in the marsh districts the mean duration of life is on the whole population smaller, this may be compensated by the lessened mortality in infancy, which enables more children to reach an age when their labour becomes profitable, and in this way the loss to the state may really be not greater in the low country. Dr. Reinhard answers this by pursuing Quetelet's method of determining the number of "productive" years of life which, on the average, each individual has. Taking, instead of the 15th, the 20th year as the first year of productive life, he assigns to every person born living—

19·18 productive years in the Marshy Districts.
20·12 „ „ Hill „

So that it is proved that there is a loss of 1 productive year to each individual.

Dr. Reinhard compares, also, the births in these two districts, and shows that in the births to each marriage are—

In the Marsh Districts .. .. 3·5
„ Hill „ .. .. 4·5

So likewise, a most decided unfavourable influence on the propagation of life is also traceable to marshes.

When it is remembered that the district of Saxony, which has furnished these numbers, is not very highly malarious, and that the pernicious forms of intermittent are extremely rare, the evil influence on length of life, and on the propagation of the race, will appear even more marked.

Campaigns.

The Mexican War.—So little has been allowed to become known of the condition of the French army in Mexico, that no authentic medical history of that curious campaign can at present be given. It is tolerably well known that the losses from vomito, and the sickness from malarious fevers and

dysentery, have been considerable. The French appear to have lingered too long in the terra caliente, and did not push on early enough, on account of want of transport, to the first ridge of high lands, which would have secured them from yellow, and the severest malarial fevers. The difficulty of communication has therefore been the great cause of their loss, and the probability is, that the period of greatest sickness is now gone by, and that the latter part of the campaign will be more fortunate than the first. Among the early deaths from yellow fever, was that of M. Lallemand, one of the Professeurs Agrégés of the Val de Grâce, a military surgeon of great excellence, who had acquired an European reputation by his work on Alcohol, and before whom a most brilliant career was opening. He fell a victim to his own energy and devotedness. Some other medical officers have also died.

*The American War.**—The time has not yet come for a complete account of this war, and all that can be done is to note under several heads some of the most striking points of the medical history of the campaign of 1862.

Federal Army.

1. *Reorganization of the Medical Department.*—In the beginning of the year the inefficiency of the old medical department of the United States army had become so manifest, that it was determined to institute a thorough reform. Several Bills were introduced into Congress, the best of which was that of Senator Wilson, which provided a Director-General, with the rank and pay of Brigadier-General; 1 Sanitary Inspector-General, with the rank and pay of a Colonel of Cavalry; 8 Sanitary Inspectors, with the rank of Lieutenant-Colonels; 40 Surgeons of the 1st Class, ranking as Majors; 50 of the 2nd Class, ranking as Captains; 100 Assistant-Surgeons, ranking as 1st Lieutenants, and 100 Medical Cadets. This was for the regular army, and independent of Volunteer Surgeons, who are now in the field in large numbers.

This scheme was afterwards modified, and eventually the following organization was made:—

1 Surgeon-General, with rank and pay of Brigadier-General.
1 Assistant Surgeon-General, with rank and pay of Colonel of Cavalry.
1 Medical Inspector-General of Hospitals, charged with all sanitary duties, with rank and pay of Colonel of Cavalry.
8 Medical Inspectors, with rank and pay of Lieutenant-Colonel.

A smaller number of Surgeons and Assistant-Surgeons were appointed, and a corps of Medical Purveyors was formed, under the orders of the Surgeon-General.

At the same time, the business of the Surgeon-General was lightened. At first he and his assistants were "cruelly hampered" by merely "clerical duties," instead of every routine work of this kind being performed, as it should be, by non-professional clerks. The old Surgeon-General was superseded, and in his place Dr. W. A. Hammond was appointed; a gentleman of European reputation for his physiological and chemical inquiries; he had been for some years an Assistant-Surgeon in the United States army, and then left it to become Professor of Anatomy and Physiology in the University of Maryland. He appears to have given great satisfaction by his energy and prudence.

The supply of Surgeons was, of course, drawn from the civil practitioners, and it is stated that in 28 months from the commencement of the war, 1,200 Volunteer Surgeons went into the field. As might have been anticipated, the sudden demand for experienced men could not be answered in America, any more than it could have been in England or France. Many of these men were, no doubt, excellent Surgeons, but some were worthless, and great efforts were made to educate them for their duties. Short and pithy treatises were issued to them on the most common camp diseases, and injuries and operations, and selections from the English Sanitary Reports were made. Mr. Longmore's treatise on Gun-shot Wounds was reprinted and circulated;

* These statements are chiefly taken from the *American Medical Times*, and the *Boston Medical Journal*.

and in this way the inevitable deficiencies of untrained men were met, and it is to be hoped partly overcome. Towards the end of the year, it was ordered that all men desiring to enter as Assistant-Surgeons should pass an examination, and one set of questions has been published, which show that the standard has been fixed high. In addition to this examination, the Surgeon-General has strongly urged the formation of an Army Medical School, similar to the English and French schools, which were both inspected on behalf of the American Government, by Professor Lee, of New York, in June 1862. The American School has not, however, been yet established, and will probably not be till the return of peace.

In spite of the immense number of Surgeons, complaints have been made that there were not nearly enough. "The horrors of the battle-fields of Bull's Run, Fort Donaldson, Pittsburgh Landing, and Williamsburgh, will," it is said, "never be written." After the battle of Fair Oaks, also, there was a great scarcity of surgeons.

2. *The Sanitary Duties.*—Very early in the war a Sanitary Commission was formed, at first unconnected with the Government, and supported by voluntary subscriptions, but its utility was so soon evident, that it became virtually a Government department, and has largely assisted the regular Medical Service. Up to May, 1862, the Commission had sent out from the depôt at Washington 65,000 articles, embracing every necessity for the sick, from casks of wine to shirts.

The Army Sanitary Inspectors appear to have been also extremely active, and some of the leading Generals appear to have earnestly seconded their efforts.

In the Department of the South, General Hunter issued Sanitary Rules, of which the following is an epitome; it may be taken as a sample of the orders made in all the camps:—

1. *Camps.*—Malarious ground to be avoided; tents to face to the south; each camp to be thoroughly "policed" twice a-day, and all surface garbage to be buried.
2. Each tent to be covered at the top, and half down the side, with brushwood or palm leaves, and to be floored at an elevation of 3 inches from the ground. When this cannot be done, each soldier to have a bunk raised 18 inches from the ground, on side poles, supported by forked sticks. Quartermasters to furnish barrel staves.
3. Tents to be struck three times a-week, and every article to be aired. On the days when tents are not struck, the sides to be raised. At night the back seam to be opened 2 feet, and kept open by a cross stick. An officer of each company to inspect the tents every night, to see that this important regulation is carried out.
4. Sinks (latrines) to be sunk at a due distance on the lee side, and covered every day with earth a foot thick.
5. Fresh meat to be used as much as possible. Men to be taught to fish.
6. Vegetables to be frequently issued. Extra ration of coffee to the men on guard.
7. Reveillie to be sounded half an hour after sunrise, and not before. Breakfast to be ready for the men when they leave their tents. All the men to bathe thoroughly twice a-week, and change their underclothing once a-week, or oftener, if practicable. The hair and beard to be closely trimmed. All soldiers on night and sentry duty to have india-rubber ponchos.
8. An officer of each company to superintend the cooking. All men on duty in malarious districts to have quinine as a prophylactic.
9. Officers of the Medical Staff to see that the provisions of this order are complied with.

3. *Amount and kind of Sickness.*—At present no accurate statement can be made even of the army on the Potomac, much less of the Western and Southern armies.

In July, 1862, a Table was given in the American "Medical Times," by Dr. Elliott, purporting to show the loss in nine months, to March 1st, 1862. Increasing the numbers by a quarter, to get the ratio per annum, it appears that the loss per 1,000 of strength per annum was—

Deaths	67·5
Invalided	125·
Missing	17·5
	210·0

Or, in other words, there was an annual loss of nearly 1 man in every 4; there are very nearly 2 invalids to every death. Up to the month of March it is said that there had been—

32,400	Deaths.
60,000	Permanent Invalids.
8,400	Missing.
100,800	

Since that time the amount of sickness has greatly increased.

In October, in the district of Columbia (including Washington) alone, there were 47 general hospitals, containing at that time not less than 50,000 men. In Washington alone there were 20,000 patients.

In November, 1862, there were 150 general hospitals in the North, containing 60,500 sick; the attendants upon these men were—

400	Stewards.
300	Wardmasters.
6,051	Male and Female Nurses.
3,025	Laundresses.
2,017	Cooks.
11,393	

After the battle of Antietam the total number of sick and wounded in all the divisions of the army was said to be 90,000.

The diseases, however, were on the whole light, and the Surgeon-General, in his Report ending June, 1862, and issued in October, states that the health of the troops was excellent; that scurvy had been almost entirely prevented, and yellow fever had had few victims, owing to the excellent sanitary arrangements.

Other accounts are, however, not quite so favourable, and great complaints were made even of the Army of the Potomac, which was the best cared for of all.

In a leading article in the American "Medical Times" of August, 1862, the following reasons are given for the sickness of the "Grand Army:"—

"1. Unfit persons had been enlisted in great numbers.
"2. The camps had been unhealthily located; the Army of the Potomac had scarcely ever been on healthy ground.
"3. There had been a disregard of camp police.
"4. The food had been improper, and was badly cooked. 'Government,' it is said, 'has been lavish of money, but has allowed the most consummate knaves to make the purchases; every article that could be adulterated has been, so thoroughly, that of many articles the original cannot be detected by the senses, and yet the Government has originally paid the highest market price. In regard to the cooking, it is safe to say that the food could not well be made more unpalatable or indigestible."

In fact, it is very much the old story of all the wars that have ever been waged. The Americans have now learnt the bitter lesson, which is unhappily so familiar to Europeans.

Of the kind of sickness, not much can yet be said. Diarrhœa, from bad food, and from drinking surface water, was very common. In August, 1862, in the Peninsula, the malarious fever had quite "a typhoid" character. There was extraordinary inertness, and incapability of making the least muscular exertion; there was often diarrhœa, and in the worst cases a deep bronzed discoloration of the skin (from pigment?). Decided periodicity is not mentioned, but the malarious origin was shown by the disease rapidly yielding to quinine and stimulants.

In Missouri there were some cases of true typhoid fever, with enormous intestinal disease, and running a very rapid and fatal course. At first stimulants were used, but as the cases all died, the plan was changed, and cupping was had recourse to, with small doses of turpentine, castor oil, and opium. Alcohol was entirely omitted. "From the time this change in treatment was made, every case (but one of old standing) recovered."

Measles continued to prevail slightly in some of the armies. Variola was vigorously met by vaccination.

At New Orleans the rule of General Butler was attended with one good result. "Never on the American Continent," we are told, were sanitary measures enforced with such rigour, and the consequence was, that there was no outbreak of yellow fever. At Port Royal, where there "were undrained reservoirs of sewage," the yellow fever prevailed, and commenced at those particular points.

In the army of the Mississippi there was much scurvy, ague, and conjunctivitis. There was also much diarrhœa, which was attended with one curious symptom, a great weakness in the knees. As usual in scurvy, there were a number of quite unexpected sudden deaths.

Very little is known of the surgery of the war. At Corinth there was tetanus, which is stated to be "the scourge and dread of the surgeon," so that it must have prevailed to a great extent.

The Surgeon-General commenced in June, 1862, collecting materials for a Complete Medical and Surgical History of the War.

4. *The Hospitals.*—The general hospitals appear to have been very well cared for; everywhere local associations visited them, and the Sanitary Commission, as well as the Army Inspectors, superintended them, as far as they were able. Still, many of them became overcrowded; the surgeons were said to be too solicitous about warmth, and too careless about air; in some hospitals, instead of the regulation 1,000 cubic feet, 250 only were given. There was a want of cleanliness, and in many cases the sewerage was bad. Still, on the whole, their condition appears to have been creditable to the army surgeons.

In October, the Surgeon-General ordered, that in all hospitals ventilated by windows alone, one man's allowance of air should be 1,200 cubic feet; in pavilion hospitals, ventilated by the ridge, 600 cubic feet; in all other buildings, 800 cubic feet; in hospital tents, only 5 patients in winter, and 8 in summer, as a maximum.

The washing of clothes was not very efficiently done, and recommendations were made on this point by the Surgeon-General.

A new Diet Table was issued in October, of which the material part is subjoined.

DIET TABLES for General Hospitals, October, 1862.

	Full Diet.	Half.	Chicken.	Low.	Milk.	Beef Tea.
Meat	16 ozs.	8 ozs.	12 ozs.	8 ozs.	..	8 ozs.
Bread	18 „	16 „	18 „	14 „	14 ozs.	12 „
Potatoes	8 „	6 „				
Other Vegetables ..	8 „	6 „				
Rice, Hominy, or Indian Meal ..	1·6 „	1·6 „	..	..	2 ozs.	
Salt	0·16 gill	0·16 gill	0·16 gill	0·16 gill	..	0·32 gill
Coffee	·8 oz.	·8 oz.				
Tea	·12 „	·12 „	0·24 oz.	0·24 oz.	..	0·24 oz.
Sugar	2·4 „	2·4 „	2·4 „	2·4 „	1 oz.	2 „
Milk	8 „	8 „	3 „	8 „	3 pints	4 „
Butter	1 „	1 „	1 „	1 „		
Flour	0·25 „	0·25 „	..	2 „		
Molasses	0·32 gill	0·32 gill				
Vinegar	0·32 „	0·32 „				

Extra Diets and Drinks :—

Beef Tea	Clam Soup	Toast
„ essence	Vegetables (special)	Chocolate
„ extract	Milk	Cocoa
Mutton Chop	Sugar (white)	Blanc mange
„ Broth	„ brown	Wine Jelly
Veal Cutlet	Cracked Wheat	Oranges
Ham, broiled	Gruel, corn meal	Lemons
Poultry	„ oat meal	Ice
Game	Farina	Barley Water
Eggs	Corn starch	Wines
Fish	Tapioca	Beer
Oysters, raw	Crackers	Cyder, &c.
„ stewed		

At the hospitals in Wheeling (Virginia), there was at one time much low sickness, and the surgeons were ordered to use more stimulants. In September, female nurses were ordered to be employed, and Miss Dix was appointed Superintendent ; the numbers were 1 woman to 2 men nurses.

"Flying hospitals," consisting of a mule corps, and cacolets and paniers, containing hospital supplies of all kinds, to accompany rapid expeditions, were organized by Dr. Hamlin, in General Sigel's army, and are said to have been highly useful.

In building fresh hospitals, the pavilion plan appears to be almost universally followed.

5. *Conveyance of Hospital Stores and Sick Men.*—As usual in all armies, there have been great complaints on this point. Transport often fell short, and then the carts appropriated to medicines were seized. In fact, in an army, the supply of food, forage for horses, and ammunition, is so absolutely indispensable, that all other things which can be delayed will be. At first the army medical department was "entirely dependent on the Quartermaster of Transportation for all transport of supplies, not being allowed so much as an humble mule train to bring forward its most urgent requisitions ; if forage and other supplies are demanding transportation." The most stringent orders issued on this point appear to have been disregarded. The amount of transport for a large army is so enormous, that the available amount must almost always fall short of what is wanted ; but the Federals appear to have been extremely remiss in one point, viz., in the formation of an ambulance corps for their wounded men. It was calculated that 500 men were lost from this cause alone, after the battle of Antietam. The Surgeon-General made the most forcible representations on this point. At length, in August 1862, an ambulance system was organized by General M'Clellan, for the army of the Potomac, of which the following are the important points.

The Staff of the Ambulance Corps was ordered to have the following strength :—

1 Captain of Ambulance Corps to each army corps.
1 First Lieutenant for a division.
1 Second Lieutenant for a brigade.
1 Sergeant for each regiment.

Allowance of ambulances :—

1 transport cart, 1 four-horse, and 2 two-horse ambulances* for a regiment.
1 two-horse ambulance for each battery of artillery.
2 two-horse ambulances for the head-quarters of each army corps.
Each ambulance to have 2 stretchers.
2 men and a driver to each ambulance, and 1 driver to each transport cart.
The Captain to be the commandant, "under the direction of the Medical Director."
"Previous to, and in time of action, the commandant will receive from the Medical Director his orders for the distribution of the ambulances, and the points to which he will carry the wounded."

* The description of the ambulances is not given, but the two-horse ambulances probably carried six men.

Full details of the duties of the officers are given.

2 medical officers from the Reserve Corps of Surgeons, and an hospital steward, to be detailed to accompany the Ambulance Corps.

The orders are very stringent to keep this corps to its proper duty. Nothing not properly belonging to the corps is to be put into the waggons.

"Any attempt by a superior officer to prevent the commandant from doing his duty in this, or any other instance, he will promptly report to the Medical Director of the army corps, who will lay the matter before the commander of that corps."

"The latter will at the earliest possible moment place the officer so offending in arrest."

Good serviceable horses to be used, and not be taken for any other purpose.

Commanders of the Ambulance Corps, "on being detailed, will report without delay to the Medical Director for instructions."

Order of Major-General M'Clellan, dated Harrison's Landing, August 2, 1862.

One part of this order is very important—the commandant, a military officer, is put under the orders of the Medical Director. It is obvious that this is the common-sense arrangement, though probably in the English army such a plan would be objected to, on the ground that medical officers cannot have command, and a system of requisitions would have to take its place. In the American army, General M'Clellan, whose railway training has doubtless stood him in good stead in making such arrangements, has not fallen into the error of demanding a result, and of refusing the best means of obtaining it.

Confederate Army.

Of the state of health of the Confederate Army much less is known than of the Federal troops. In Chisholm's "Manual of Military Surgery" there are some brief notices which may assist us in forming a few general conclusions. It would seem certain that the Confederates, like their opponents, have suffered severely from disease. Chisholm writes, "Our list of killed and wounded has been very small, our mortuary and sick list enormous. One to thirty would not be an exaggerated proportion of wounded to sick in the army of the Potomac alone, which, of all others, has been most exposed to the fire of the enemy" (p. 13). And in another place he refers to "the thousands of sick" carried from Manassas to Richmond. No numbers, however, are given.

Among the diseases which prevailed in the Confederate Army, measles is particularly mentioned. In last year's Report the great prevalence of this disease among the Federal troops was noticed, and it was inferred that the mortality which followed it, and which some attributed to typhoid fever, was really owing to acute tuberculosis. This inference seems to be confirmed by a statement of Chisholm's. He says, "The measles, a mild disease, which excites no alarm under ordinary conditions of protection from the weather, strikes terror in a camp, where its sequelæ of pneumonia and phthisis are truly fearful. This disease alone has laid a heavy per centage upon the effective strength of our army" (p. 3).

He then says, "Add to this and kindred eruptive disease, glandular affections, tuberculosi, capillary bronchitis, typhoid and malarial fevers with diarrhœa and dysentery, and we have already summed up the chief causes of army mortality and deterioration of strength."

The hygienic rules in the Confederate Army are based entirely upon European experience, and we do not observe any new suggestions. The following is the clothing allowed in the Confederate Army:—

	For Three Years.			Total for Three Years.
	1	2	3	
Cap, complete	2	1	1	4
„ cover	1	1	1	3
Coat	2	1	1	4
Trousers	3	2	2	7
Flannel Shirt	3	3	3	9
„ Drawers	3	2	2	7
Bootees (pairs)	4	4	4	12
Stockings	4	4	4	12
Leather Stock	1	..	..	1
Great Coat	1	..	..	1
Stable Frock (for Mounted Men)	1	..	..	1
Fatigue overall (for Engineers) .	1	1	1	3
Blanket	1	..	1	2

The accoutrements are not described at length, and we are not always certain whether the author is referring to what is used in the Confederate service, or is simply quoting from English and French works.

The tents used as hospitals in the Confederate service are 14 feet long, 15 feet wide, and 11 feet high in the centre, with a wall 4½ feet high. The ridge pole is made in two sections, measuring 14 feet when joined. Two or more tents can be thrown into one. Each tent is for 8 or 10 patients, and there is 1 hospital tent for each company, or 3 for 10 companies, giving accommodation for 10 per cent. He says, that "Those treated in a tent hospital always convalesce much more rapidly than those collected together in a large hospital building."

Considerable use appears to have been made of Jones' soup or meat cakes, which are composed of meat and vegetables, and can be cooked in fifteen minutes.

The transport of sick appears to have been generally carried on by a four-wheel spring wagon. It consists of a square body, 3½ feet wide, and 7½ feet long, placed on 3 springs. Two stuffed seats run the entire length, and the drop from this, which is also cushioned, can be raised, and thus a bed is formed extending the entire length. There is a cloth cover and side curtains, supported by a frame. Two 5-gallon kegs for water are suspended below. Such a wagon will carry 2 men lying, or 10 to 12 sitting.

For a regiment the allowance is —

2 four-wheeled ambulance wagons ;
10 two-wheeled ambulance wagons ;
4 two-wheeled transport carts.

The "Coolidge," a two-wheeled ambulance wagon used in the Federal Army is said to be too complicated.

In the Confederate Army an Ambulance Corps was early formed. A given number of suitable men were selected from each brigade, for a permanent Ambulance and Field Hospital Corps ; when approved by the medical officers, they were trained, and then remained non-combatants. This plan has answered admirably.

TYPHOID FEVER IN INDIA FROM A SANITARY POINT OF VIEW:

Its Clinical Characters, Morbid Anatomy, and Etiological Relations.

By W. Hanbury Esq., Surgeon, 33rd Foot.

I am desirous to invite attention to a form of fever which occurred in the 33rd Foot, stationed at Deesa, in the autumnal months of 1859, the morbid anatomy of which was of a kind at least unusual in this country. My experience among British troops in India, extending over a period of more than ten years, has not furnished me with examples of similar changes of structure in any disease, nor am I aware that they have ever formed so prominent a featu re of fever in any previous description of the various types or forms which it assumes in this country. As the interest of the disease rests mainly on the morbid changes disclosed after death, and the clinical history and character of the affection can be fully exhibited in the description of the fatal cases, I shall refer to these only. The identity of the subject will thus be preserved, and no doubt will arise as to the real matter under consideration; but it will be readily understood (though we do not affect to diagnose them) that a large number of cases of fever, which at this time terminated in recovery, presented symptoms greatly resembling those which characterized the cases we have selected for observation. Next in importance, however, to the pathology of any disease, are its etiological conditions; in this instance they are especially deserving of attention, and it will be necessary not only to state them with even more than ordinary precision, but to note particularly the consequences of their removal. The disease in its sanitary relations was indeed full of significance, and highly instructive; and it will be found that the conditions under which it occurred, as well as the absence of these conditions, determined the standard of health and physical efficiency of the troops, and shaped, in a great degree, the medical history of the regiment during the whole period of its service in Guzerat.

Case 1.—J. W., aged 16, admitted 20th August, 1860, with ordinary symptoms of pyrexia; but tongue is white and pasty, with red tips and edges, and there is considerable depression.

August 23rd.—Depression and weakness have increased, and face has a sunken appearance; there is, however, little heat of skin, and pulse is rather slow; bowels are not purged, but there is an excited state of the tongue, and dejections present an unhealthy aspect, being of a dark yellow colour.

August 24th.—General symptoms evidence more asthenia; tongue is somewhat dry, and still red, and articulation is difficult, through want of power; no abdominal pain is complained of, nor does pressure easily elicit the expression of any. On deep and forcible pressure, however, in the situation of the cæcum, ileum, and part of the ascending colon, pain and shrinking are produced, and there is some gaseous gurgling heard there. Dejections of a dark yellow colour.

August 25th.—There is still greater asthenia to-day: he now lies in a semi-lethargic state, countenance collapsed, tongue is dry and red at point and edges, and protruded with difficulty; articulation still more imperfect; pulse small, but not much accelerated; dejections, voided three or four times in the twenty-four hours, are liquid, and of dark, unhealthy appearance.

August 26th.—A tendency to stupor is observed this morning; great difficulty of articulation exists, and tongue can scarcely be protruded; heat of skin has been moderate throughout; dejections are still of the same character, and pulse is small and feeble.

August 27th.—Sank gradually during the day, and died from asthenia, about 6 P.M. last evening.

Autopsy 12 hours after death. *External appearance.*—Body somewhat emaciated, and marked by blister over cæcum. *Thorax.*—Lungs much congested throughout, especially posteriorly. *Abdomen.*—Liver congested, but remarkably healthy in structure. The upper two-thirds of ileum presented nothing abnormal, lower-third was of a purple colour in several places externally, but the peritoneal coat was smooth, moist, and devoid of all traces of

disease. Mucous membrane of the lower part of the gut was injected over some extent of the canal, the vascularity of a dark, livid, passive character, and presenting an arborescent appearance. Gangrenous ulcers were observed on the ileo cæcal valve, and three or four ulcers in the lower part of ileum, while in some places the mucous lining was found to have been thrown off in oval patches half an inch in length, by sloughing or ulceration. Large intestine was free from all indications of disease, but there was a submucous melanothic patch observed at one part of the canal, and the calibre of the lower part of the intestine was contracted.

Case 2.—H. M., aged 23, suffered from a severe and protracted attack of fever in May and June, 1859, and continued weak and exsanguined from the date of his discharge, on the 22nd of June, till the 11th of September, when he was again admitted, with grave symptoms of fever, namely, loss of appetite, tendency to collapse, headache, feeble pulse, heat of skin, and foul tongue, coated with a glairy mucous.

September 12th.—There is no improvement to report; he lies in a feeble, apathetic, and prostrated state; heat of skin alternates with diaphoresis, of a somewhat passive character; tongue presents the same appearance, and there is no appetite; bowels have been moved two or three times, and the motions are liquid, though presenting a healthy, bilious character.

September 13th.—Symptoms are still more unsatisfactory to-day, and a great tendency is observed to the development of a lethargic state, prostration, and collapse; pulse is slow and feeble; tongue continues moist, and is covered with a glairy mucous; flushes of heat alternate with feeble diaphoresis.

September 14th, 8 A.M.—During the last two hours has passed into a most alarming state of collapse, and is now with difficulty made to swallow anything; trunk is warm, and covered with profuse diaphoresis; pulse is scarcely perceptible at the wrist; pupils are contracted; he is quite unable to protrude his tongue, and he is scarcely sensible to the vapours of ammonia.

September 15th.—Sank gradually during the day; transient flushes, alternating with profuse passive diaphoresis, and he died at 3 in the evening.

Autopsy 17 hours after death. *Thorax.*—Lungs somewhat congested; heart small, and deficient in muscular development. *Abdomen.*—Liver normal as regards size and colour, but somewhat friable, and easily broken down; intestines presented no traces of inflammation externally, but were of a pale pink colour, deepening in shade towards the lower end of the ileum; the coats of the small intestine were somewhat thinned, and of the lower-third of it there was more or less softening. On cutting into this part of the canal, ragged sloughing ulcers, almost penetrating the bowels, were presented in several patches—more numerous towards the cæcal end of the small intestine. The ileo-cæcal and colic valves were destroyed by gangrene; but in the upper part of the cæcum, although the mucous membrane was softened, and of a pink colour, the lesion of texture did not extend beyond enlargement of some solitary glands and mucous follicles, with here and there points of incipient ulceration.

Case 3.—W. W., aged 31, admitted 8th August, 1859, affected with debility, loss of appetite, and slight heat of skin, and relaxed bowels; pulse was languid and feeble; respiration hurried and superficial, though physical signs of disease of the chest were absent.

August 9th.—Continues in a weak, unsatisfactory state; and though there is scarcely any heat of skin, he lies in a feeble, depressed condition, respiration being hurried and superficial.

August 11th.—Little change has occurred; breathing is hurried and shallow, and head and chest are bathed in perspiration; depression and loss of appetite continue; tongue is rough and dry at point, but not red, and pulse of tolerably good volume; respiratory sounds distinct on auscultation.

August 13th.—Has not improved; dejections are fetid, liquid, and slate-coloured; there is tenderness on pressure over the right and left iliac regions; tongue is rough and coated; pulse soft, and tolerably regular; chest resonant.

August 15th.—Was somewhat delirious last night; tongue is dry, and sordes collects on the teeth; is very deaf; and there is a copious discharge from the bowels of liquid, dark, and fetid evacuations, two or three times daily.

August 16th.—Is much worse; signs of nervous exhaustion are now more

apparent; tongue is protruded slowly, and hands are tremulous; an offensive slate-coloured fluid is discharged from the bowels in considerable quantity; pulse tolerably good; skin hot and dry.

August 17th.—Continues to lose ground; tongue is moist, and pulse of good volume, but skin is hot, and somewhat dry; the tongue is protruded with difficulty, and there is a tremulous motion of the hands, and the bowels are still purged.

August 18th.—Is much worse to-day; he is constantly talking to himself, in a state of muttering delirium; is now unable to protrude the tongue; and dejections, dark, liquid, and fetid, are voided in bed.

August 19th.—Symptoms are still more unfavourable; he lies on his back, in a perfectly helpless state, muttering incessantly, and pulse is losing volume; there is floccitation, and the dejections are voided in bed.

August 20th.—Sank rapidly since yesterday, and died at 6 A.M. this morning.

Autopsy 5 hours after death. *External appearance.* — Considerable emaciation, and marks of blisters over each iliac region. Abdominal walls protuberant, and tympanitic; small intestines presented no marks of inflammation on the peritoneal coat, but close to the ileum they were of a dark purple colour. In the upper two-thirds of the canal the mucous membrane was of normal appearance and structure, but in the lower-third there were several gangrenous ulcers, or rather patches, covered with a sloughy, grey membrane, like dirty tow, and more numerous near the cæcum. Interspersed between these ulcers were enlarged glands or follicles, filled (apparently) with a cheese-like substance, and in a state of incipient ulceration or gangrene. The mucous membrane, wherever it remained, was of a dark colour, and the ileo cæcal and colic valves were also destroyed by the gangrenous process. The mucous membrane of the cæcum, and part of the ascending colon, was the seat of several ulcers or gangrenous spots, but of a less size, and the glands and follicles were dilated with a cheesy matter, passing at several points into ulceration. A dark inky fluid filled the whole tract of the large intestine, and the blood of which it was in great part composed was probably thrown out to a great extent from the irregular gangrenous surface resulting from destruction of the valves mentioned above. The liver and kidneys presented nothing unusual in appearance or structure.

Case 4.—T. P., aged 20 years, admitted 22nd August, with general symptoms of fever.

August 24th.—Slept badly; tongue furred in the centre, and of a bright red colour at the tip and edges; bowels relaxed; pain is complained of on pressure applied to the abdomen.

August 25th.—No improvement has occurred, and he has been delirious during the night.

August 26th.—Slept well last night, and is much quieter and better to-day; tongue of a red colour still; does not complain of pain anywhere.

August 27th.—Pulse is very weak, and he is restless; muttering and tossing about very much; tongue moist, but unnaturally red; skin cold; bowels moved twice since yesterday.

August 27th, 5 P.M.—Became gradually weaker during the day, and died at 5 o'clock this evening.

Autopsy 16 hours after death. *Thorax.* – Heart and lungs were found in a healthy condition; the latter were, however, somewhat congested. *Abdomen.* —Liver exhibited no trace of disease; the peritoneal covering of the intestines presented the normal appearance. On laying open the small intestines the mucous membrane was found free from ulceration, except in the lower two feet of the ileum, where it was ulcerated in several places, as were also the ileo-cæcal and colic valves; a large ulcer was observed in the cæcum, and several ulcers at the junction of cæcum and colon; but in the colon itself nothing was presented except a few slightly vascular patches.

Case 5.—M. K., aged 21, weak, reduced, and anæmic; admitted 2nd July, complaining of loss of appetite, debility, thirst; pulse is low and feeble; tongue covered with a white coating; bowels tolerably regular.

July 4th.—Little change is presented; he is still extremely weak, and has little appetite.

July 6th.—Is somewhat weaker, and is scarcely able to sit up for more than

a few minutes at a time ; there is very little pyrexia present ; appetite is still very indifferent ; tongue clammy ; towards evening slight heat of skin is observed, with some degree of thirst ; bowels regular.

July 7th.—Continues extremely low ; physical symptoms of a low obscure nature are observed, with dryness of the mouth and tongue ; the latter is red at the edges and tip ; bowels are regular ; there is no appetite, and little disposition is shown to give expression to wants of any kind.

July 8th.—The symptoms are of a still graver nature ; some delirium is observed this morning, and he succeeded in getting out of bed once ; tongue is dry and red ; pulse small and slow ; skin is cool and dry ; countenance is depressed, and sclerotic is cloudy.

July 9th.—Continues in a very low, prostrate state ; tongue is dry and red at point ; countenance pale and sunken ; lips somewhat livid ; pulse small and slow ; skin cool ; respiration shallow ; appetite indifferent ; but the apathy of his state does not allow him to indicate his wants, and he is therefore fed carefully and often ; there is no delirium.

July 10th.—Lies in an extremely low, apathetic state, this morning ; protrudes tongue with difficulty, but it is dry only at the point ; the livid, sunken aspect of the face, is yet observed, and there is slight disposition to stupor ; the action of the pulse is very feeble ; chest is rather hot, though moist ; limbs are cool ; passed a considerable quantity of feculent matter during the night.

July 11th.—Is extremely feeble and apathetic this morning ; tongue protruded with difficulty, and the motion of the organ is tremulous ; countenance pale and sunken, with livid tint ; bowels moved regularly, dejections being feculent, and of proper consistence ; urine voided freely.

July 12th.—Is almost incoherent, and can scarcely articulate in an intelligible manner ; skin warm and moist ; pulse of moderate volume still ; tongue is dry, and protruded with difficulty ; *vespere*, about 10 A.M., after having passed a liquid feculent motion (brought off by an enema), a large quantity of liquid grumous blood was voided, which induced sinking, and blanched his features. During the day blood was evacuated to some extent in the same manner, and he now lies in an extremely exhausted state, and though tolerably sensible, he is yet too weak to express his wants.

July 13th.—During the night there were several large evacuations of blood from the bowels, and he is now incoherent—unable to articulate, collapsed, and of waxy paleness. The pulse has been scarcely perceptible since the first appearance of blood in the evacuations ; and pressure over the right iliac region, and the hypogastric, also was attended with pain ; but up to that time all manipulation was borne with ease, and frequent inspection of the dejections discoviered nothing abnormal, except that the feculence was passed in small hard masses occasionally.—Died at 10 A.M. this day.

AUTOPSY 6 HOURS AFTER DEATH. *External appearance.*—Considerable emaciation ; marks of slight bed sores on each buttock. *Thorax.*—Viscera healthy, and of normal appearance. *Abdomen.*—Liver of a pale nutmeg colour, but of ordinary consistence and structure ; spleen congested, and slightly enlarged. *Intestines.*—Peritoneal covering pale, and free from all traces of inflammatory action ; external surface pale, moist, and shining, the different folds and convolutions being unconnected by any morbid adhesions. Mucous lining of stomach was of a pale pink colour, and healthy in structure, as was also that of duodenum, but a "lumbricus," about 8 inches in length, was found imbedded in some bile. Small intestine was healthy and normal in every respect, down to the last three feet of the cæcal extremity ; at this part, four or five livid-looking patches, at intervals of several inches from each other, were observed on the external surface of the ileum, one of which gave passage to the contents of the canal. On opening the gut itself, the mucous and muscular coats were found in a state of gangrene, forming dark grey sloughs at the points where the livid discolorations were seen externally, but there was no attempt at reparation made, and no lymph effused. Proceeding downwards, and laying open the large intestine, a very sloughy gangrenous condition of the ileo cæcal and colic valves was noticed, and from this point the mucous membrane of the cæcum and colon was covered throughout their entire extent with a semi-coagulated layer of dark venous blood, though the membrane itself bore no traces of inflammatory action, and was simply tinged of a dark pink colour

(caused apparently by the blood in contact with it), while externally this portion of the intestines presented its natural appearance.

In dissecting the small intestines a curious instance of abnormal conformation was discovered; a portion of the walls at one side being absent, a pouch, capable of containing about four ounces of water, was thrown off from the canal, without affecting the size of its calibre.

Case 6.—J. B., aged 23, admitted on the 25th of August, 1859, and died on he 14th September, 1859. The symptoms were similar in kind to those recorded in most of the preceding cases, but I am unable to refer to the diary notes in which they are detailed. The following were the post mortem appearances:—

Autopsy 10 hours after death. *Thorax.*—The viscera of this cavity were healthy, and presented no abnormal appearance. *Abdomen.*—The liver, and all the abdominal viscera, were more or less softened. On opening the intestines, large rugged ulcers of the agminated glands were seen on the ileo-cæcal valves, and on the adjacent four feet of the ileum. The mucous membrane of the large intestine bore traces of inflammation, but no ulcers were found here.

The clinical and anatomical characters of the disease are illustrated in the cases now detailed, and it must be admitted that they were both of a very unusual description. The particular form of fever, of which these cases are to be considered examples, is the question which now presents itself for solution, but it is one which admits, I think, of a conclusive, if not a very simple reply. *A priori*, it might reasonably enough be supposed that no difficulty could be experienced in classing them under the head of remittent fever, from the very fact of their occurring in India during the autumn months of the year, as well as from the circumstance that numerous cases of intermittent and remittent fever were recorded in the regiment at the time, in the treatment of which quinine was resorted to with more or less advantage. Moreover, it cannot be denied that some of the symptoms were of a kind to lend support to this view, for example, the occasional remissions, particularly in the early stages; the rapid occurrence so often of adynamia; the absence of all evidence of contagious properties (which are thought by some to belong to typhoid fever); the oppressed and feeble pulse; the cold sweats, alternating with flushes of heat; the restlessness, in one or two cases; the languor, apathy, and drowsiness, in others; the muscular and nervous depression or exhaustion exhibited in the tremulous twitchings of the hands, and the quickly fatal result: but such a diagnosis can scarcely be reconciled with the structural lesions observed after death. The post mortem appearances, as we have seen, were not those characteristic of remittent fever—they were, indeed, of quite a different nature, and yet of no mere incidental or trifling kind, unconnected with the fatal result, for the morbid changes were not only extensive, and manifestly in close relation to the fatal issue of each case, but of a kind which identified the disease so far specially with *typhoid* fever. The lesions in this fever are always observed in the lower-third of the ileum, the glands and mucous follicles being the structures engaged, and the morbid changes may be effected either by ulceration or gangrene. In the present instance the process of diseased action in some cases was evidently one of gangrene or sloughing, a part of the mucous membrane and sub-mucous tissue turned brown or black, and died, and the line of ulceration was subsequently formed to throw off the dead structures. In others the gangrene or sloughing and ulceration advanced apparently *pari passu*, though probably the former occurred first in point of time, to a greater or less extent. Interspersed occasionally, but not always, between the gangrenous patches or sloughing ulcers, were enlarged or ulcerated glands and follicles, but no lymph was found effused, nor was the existence of any recuperative efforts attested by the presence of granulations. It was, in fact, a thoroughly destructive process, which never failed, especially, to attack the ileo-cæcal and colic valves, and was sometimes accompanied by blood degeneration; an aplastic deteriorated condition of the fluids, indicated by the occurrence of hemorrhage, malœna, and the absence of any attempt to repair the diseased structures. Symptoms, moreover, were not wanting to connect the disease with typhoid fever. The extreme youth of most of the patients, the red tongue, the nature of the dejections, the occasional diarrhœa, the gurgling sound, and slight pain or wincing elicited by pressure over the right iliac region, the impotency of quinine, all

afforded strong clinical grounds for assigning the disease in these cases to that form of fever. Nor can the rapid course of the affection be regarded as an objection to this view of its nature, for many cases were presented at this period which advanced very slowly and unsteadily to recovery, in which the symptoms were of a kind very similar to those which proved fatal, and it must be borne in mind that it is only the *fatal* cases of the disease which are recorded *here.* I am aware that Dr. Morehead, an officer of long experience in the Presidency, and remarkable for his great accuracy of observation, states—"That typhus, typhoid, and relapsing fevers, are unknown in India,"* and doubtless the proof of the identity of typhoid fever would have been much more satisfactory, if the specific lenticular rose-coloured eruption had been observed, but the disease is new to medical science. The non-discovery of this symptom must not be considered decided evidence of its absence, and I am the less disposed to make much account of the fact that it was not detected, as at the season of the year in which these cases occurred, the patients were covered with prickly heat—lichen tropicus, and it would have been impossible, under the circumstances, even for those well acquainted with the peculiar characters of the eruption, to recognise it with certainty.

It might, perhaps, very naturally and justly be supposed, that typhoid fever was not in any event an improbable result, under conditions such as those which marked the occurrence of these cases; but, however interesting and important it may be to realise these conditions in their relation to the etiology of the disease, after its place in the nosology has been fixed, it will scarcely be conceded that we are at liberty to assume the existence of typhoid fever from a knowledge of these conditions. The conditions may probably be predicated from the disease, but not the disease from the conditions; and the identity of the former can only be established on clinical and anatomical grounds. But assuming that the consideration of these, *per se*, has raised the proof of its existence up to a high degree of probability, it must be admitted that the recognised presence of those conditions which are known to be invariably associated with typhoid fever, gives to the proof greatly additional force.

I may indeed mention, that a minute and accurate reference to the small intestines, for the anatomical characters of the disease, in the cases above detailed, was suggested as much by a consideration of the unsatisfactory conditions of the soldier's life at the time, as by the study of the clinical features of the disease itself. And taking the direct and corroborative proofs of the existence of typhoid fever at what I conceive to be their legitimate value, I am not only of opinion that its identity is fairly established in the history of the cases, but that the disease may have hitherto escaped detection in many instances in this country, simply because the lesions characteristic of it were not sought for nor expected. If this latter supposition be correct (and it will have been observed that the external appearances of the intestine in the autopsy of the cases did not give rise to much cause for suspicion of the mischief which had taken place within), it conveys a suggestion of no small practical importance to efficient sanitary administration; for as conditions of life may prompt us to look for this disease, and lead to particular anatomical inquiry in fatal cases, so the detection of such lesions would cause us to infer that the conditions of life were not so satisfactory or unobjectionable as they may have appeared to be, and that immediate amendment was demanded.

The silence hitherto observed regarding this disease in the medical reports and returns from this and other countries, is partly explained, no doubt, by the fact already mentioned, that it is one new to medical science; but it seems pertinent to observe, that the two cases of fever, attended with ulceration of Peyer's glands, which came under the notice of Dr. Hunter, 2nd (Queen's) Regiment, at Deesa, in 1841–42,† and the two or three with similar lesions, which occurred in the experience of Dr. Morehead,‡ would probably, in the present day, be considered instances of typhoid fever, and I trust the cases now recorded may have the effect of attracting some attention to the subject.

The recognition of specifically distinct forms of disease, the extension and

* Researches on the Diseases of India, vol. i., p. 307. 1856.
† Transactions Bombay Medical and Physical Society, 1841–42.
‡ Researches on the Diseases of India, vol. i. 1856.

correction of our nosology, are the peculiar province of the clinical observer in civil life; and I believe it is already an established fact, that there is an essential difference between typhus and typhoid fever, though the question has not yet been removed from the field of discussion, but it belongs particularly to the medical officers of the public service to collect the scientific data for settling the points yet doubtful in their etiological relations, and fixing their topographical limits. The inquiries of the former tend at present to the conclusion that the difference which has so long existed between English and Continental writers on the subject of fever, is explained by the circumstance that different entities were contemplated or referred to. The experience of the latter will, in all likelihood, sanction the belief that typhus chiefly affects cold and temperate climates, and typhoid temperate and warm latitudes, and has a much wider geographical range. But whatever the final results may be in this direction, the subject of typhoid fever is one which must in future commend itself to careful study; and, apart from its histological interest, it is manifest that sanitary science will continue at fault so long as the same group of conditions or causes is held accountable for the appearance of typhus fever in one case and typhoid fever in another. The diseases would appear to be distinct, and must acknowledge different conditions in their etiology. These conditions have not yet been accurately defined. The history of typhoid fever given above proves that it is capable of exhibiting itself in one of the hottest countries in the world, where typhus has been hitherto unknown. It becomes, therefore, absolutely necessary in this case to note accurately the circumstances under which the disease was observed, in other words, the causes of the disease itself; and the facts recorded may not be without value in reference to the large question of the etiology now referred to.

II.—Etiological Conditions.

The 33rd Regiment arrived at Deesa in the early part of 1859, from the Deccan, and, on the return of two companies from Nugger Parkur, in the middle of May, the head quarters of the regiment—1,060 strong—was accommodated in the barracks and patcherries at Deesa; one company, with some invalids, being detached to the sanitarium at Mount Aboo. The married men—55 in number—occupied three of the patcherries, each family being assigned two rooms, which scarcely admitted of any degree of over-crowding. The bandsmen and drummers—45 in number—were provided with accommodation in two detached buildings behind the barracks; 80 or 90 men on an average were inmates of the hospital; and to the barracks proper were allotted about 810 men, 25 of whom were absent on guard duties by day, and 50 by night; while to the detachment of married men of the 83rd Regiment, which arrived from Nusseerabad before the beginning of the hot season, were handed over the remaining patcherries.

These arrangements continued during the last half of May and whole of June, but early in July a new patcherry was finished and made over to the grenadier company, and the pressure on the barrack space proportionately relieved. On the 1st of August 51 men were transferred to the Horse Artillery at Deesa as volunteers, and the accommodation was rendered thereby more ample, while in the following month the removal of 50 invalids to Aboo, and the departure of a wing of the regiment—446 strong—on field service to Dwarka, placed at the disposal of the soldier a very large measure of superficial and cubic space.

It appears that the accommodation of the barracks proper, and exclusive of the patcherries, is estimated as sufficient for 800 men, and that each soldier on this estimate is provided with 1,116 to 1,122 cubic feet of air. Now, as they were never, after the beginning of July, occupied by more than that number of men, it will probably be supposed that the affection could not have had any connection with overcrowding as a cause; but I find that the height of the barracks to the cross beams is only about 15 feet, and that the calculation which gives 1,116 to 1,122 feet to each man, estimates the altitude at 19 feet by adding to the height of beam half the height from beam to roof, namely, 4 feet. The annexed Table, however, shows that the superficial area only amounts to 58 or 59 square feet per man, a space which must be considered

inadequate in this country, and the more so as it includes the ground taken up by the doors on both sides of these buildings. It is manifest, indeed, that one half the height, as far as the soldier is concerned, might have been excluded as an element in the calculation of the cubic space; that the latter, for all practical purposes, would have been estimated correctly on only 9 or 10 feet of the altitude, and does not efficiently represent more than 560 cubic feet.

Taking this view of the matter, it must be admitted that the barracks were not only overcrowded, to some extent, but that in reality they are not capable of affording accommodation to the number of men for which they would appear to be officially returned. It is of course impossible in any given instance to limit or define the exact effects which overcrowding produces among a number of other more or less powerful causes of disease, but the etiology of this fever has been prominently connected in my min with impurity of atmosphere, and I must not omit to notice that there were ther conditions present, which, however limited its action, must have served to give it increased influence. For nearly eight months of the year the wind blows almost constantly from the south-west; the barracks are eleven in number, and each faces the south-west; but instead of being built in echellon, or arranged checker-wise in lines, they form two lines in such a way that each building in the front line cuts off the wind effectually from a similar one in the second line. An additional barrack (No. 11) is moreover thrown out on the extreme right in front, thus completing at this point a block of three buildings one behind the other, the front one of which alone derives any advantage from the prevailing winds. But not only is the relative position of the different barracks thus objectionable; the lines of barracks are not more than 95 feet apart—a distance wholly inadequate—and between each pair of barracks, in the most objectionable position it was possible to assign to them, were urinaries and cesspools, of which we shall have to speak presently, while the ground in rear of the barracks, and between them and the officers' compounds, though limited in extent, is covered over by the canteen, the quarters occupied by the band, the sergeant-major's house, the regimental cells, the quartermaster-sergeant's house, the drummers' quarters, and the cook-houses.

The feeling of pressure and overcrowding in the lines is indeed very disagreeable; nor is this relieved by the character of the buildings themselves, for though the barracks are well ventilated by openings in the roofs, and by numerous doors and windows, they stand upon foundations of little elevation, and have a somewhat gloomy, shed-like appearance.

With regard to the hospital, a more favourable account may be presented. It is a well-ventilated building, consisting of two pavilions connected by a capacious archway, and though its accommodation is nominally limited to 60 patients, yet no evidence existed of a vitiated condition of the atmosphere. Wounds and ulcers healed rapidly, even when occupied by 80 or 90 sick, and the available cubic space was throughout nearly one half greater than in barracks, though calculated on an altitude of only 16½ feet. Further, the duties of the troops were not of a kind to injure their health in any obvious degree; and it will be seen from the number of men on guard at night, in proportion to strength, that want of rest or sleep could not have had a prejudicial effect. Thus far, therefore, the overcrowding of barracks and the regimental lines would alone seem to have been connected with the appearance of the disease; but auxiliary to this, we have now to note the sanitary condition of the lines, as affected by the conservancy system, or arrangements which had been for some time in operation, and the baneful results of which it will be more easy to imagine than define.

Arrangements for the disposal of human excreta in military stations, however clumsy and imperfect they may be, often admit of being worked in a satisfactory manner, so long as the troops are limited to a certain number; but if this number be exceeded to any great extent, they are liable to break down, and thus exhibit their inherent want of adaptability, and radical imperfections. This is precisely what occurred in the present instance. The population of the regimental lines could not have fallen short of 1,300 people—a number far in excess of that which the conservancy system was capable of accommodating; but the system itself, as we shall now show, was faulty in the extreme, and did not admit of much expansion in its operations.

The two lines of barracks are only about 95 feet apart, and the space between each pair of barracks, small as it is, is occupied by a urinary shed, a cesspool, and an ablution room—the latter constructed in connection with the back verandah of the barracks in the front line, and having outside it a water-pit covered with a trap-door which turned on hinges, and was raised by means of an iron ring. The position of all these structures was eminently objectionable in every respect, and especially so between barracks little more than 30 yards apart, but their construction was even still more objectionable. The urinary sheds were divided inside into three compartments, by two partition walls, and ledges or troughs of masonry were erected in each of these compartments, about three feet from the floor, to receive the urine, which was conveyed into a shallow sewer, by which it was carried off to the cesspool. The building materials of the station, both bricks and mortar, are moreover of so indifferent a quality, that it is almost impossible to construct really pucka work, and the troughs, instead of forming an inclined plane, broke up and formed basins or pools in which the water lodged. The sewers broke down and crumbled away, and both gave out strong offensive effluvia. The walls of the building became infiltrated with fluid, and the water-line was sometimes marked on the walls outside, at a height several feet above the level of the troughs within, while the plaster dropped by degrees off the walls. The ablution rooms were provided with good clean wholesome water from wells within the lines, 80 feet deep, but the receptacle outside, about 2½ feet deep, was constructed in such a way that the water did not reach the level of the drain leading to the cesspool common to it and the urinary shed till it rose to the depth of a foot; and the drain itself was liable to obstruction from the same cause as the urinary sewer. The result was decomposition, and escape of gaseous products through the trap-doors, which seldom fitted accurately after they had been any time in use, and were generally cracked by the excessive heat of the sun. The cesspools, one for each of the urinary sheds, at a little distance from which they were sunk—15 feet deep—received the drainage from these sheds and the ablution rooms conjointly, and it seems to have been the impression that the water from the latter would neutralize the fluid from the former, and by dilution render it innocuous; but it was only necessary to see the cesspools being emptied, to be convinced that the theory was not realised in practice; while the cesspools themselves were subject to the same process of dilapidation as the structures referred to, and constantly demanded repair. It remains only to state, that in the working of the arrangements or system now described, the urinaries were washed out daily, and sprinkled with lime, &c., and the cesspools and water-pits cleared of their contents, which were carried to some distance beyond the cantonment limits.

The privies—two in number—occupy a position on the right and left of the lines of barracks, and the accommodation which they afforded was quite inadequate; and while the system of cesspools and sewers proved much more offensive than in the instance of the urinaries, the reception of the excreta in baskets, and the consequent diffusion of the liquid parts over the privy floors, rendered them unsatisfactory. It was not unusual, indeed, for the officers to complain of the overbearing nature of the effluvia from them, when the wind blew tolerably steady in the direction of their own lines.

It is generally understood that the soldier is well fed in this country, and it cannot be doubted that he is supplied with a very liberal allowance of animal and vegetable food; but, strange as it may appear, the occurrence of fever of this kind in the regiment has forcibly suggested the use of an unsustaining and defective diet as an accessory cause, and I feel reluctantly compelled to record my opinion to this effect.

Notwithstanding the attention which has been given to this important subject by a beneficent and liberal Government, I am not satisfied (and it would be a suppression of my sincere convictions to avoid saying so) that the food of the English soldier is of sufficiently good quality during the months of May, June, July, August, and September. It is true that his rations are made up of similar elements—animal and vegetable—and in the same quantity as at any other season of the year, but the meat is grass-fed. In May and June there is little or no grass for cattle to pick up, and they must feed mainly on chopped straw, while in July and August the grass is young and soft, nor does it acquire

any fattening properties till the end of September, when the seed has ripened. Further, in August, September, and October, potatoes or sweet potatoes are in many stations, it is to be feared, not regularly available (though there is really no efficient substitute for them in India), and the vegetables chiefly supplied are onions and pumpkins, the latter of which the soldier holds in little estimation, and will not always eat, while the former probably possesses feeble nutritive properties. In the summer and autumn months of 1859 the meat was lean, aplastic, and innutritious, and no fresh vegetables, except onions and pumpkins, as a very general rule, were issued to the troops; the latter were often thrown aside by the men, and after the commencement of the rains, I have no doubt that the meat was not only innutritious, but that it possessed, in fact, purgative properties, for at this season of the year, I have since ascertained, that beef-tea, even when carefully made, is often objected to on the part of patients, on the ground that it passes off rapidly, and brings on looseness of the bowels. What is the reason of this result is a question which need not be discussed here. It may be stated that the grass at this season purges the cattle instead of improving their condition; and it is possible the relaxing effect of the meat used as food may be in part derived from this quality of the grass upon which they are fed, while it is obvious that, if the meat itself is not fit for the purpose of complete assimilation, it will act as an irritant to the bowels, and must be expelled. But, whatever explanation is correct as to this point, it will be readily admitted that food of the description here indicated might constitute a predisposing cause (through want of sufficiently nutrient properties) of a disease remarkable for low adynamic symptoms; nor is it difficult to conceive that it might aggravate the intestinal lesions and the diarrhœa, which formed such characteristic features of the affection itself. That my views on this subject were somewhat similar at the time, appears, moreover, from the following extract from my Report on the Climate and Topography of Deesa, which has been published in the Statistical, Sanitary, and Medical Report of the Army Medical Department for 1859:*—

"Although the dietary of the British soldier in this country has frequently engaged the attention of Government during the last few years, and has undergone much improvement by the introduction into it of a pound of fresh vegetables, as well as by the allowance of an increased quantity of sugar, yet I regret to have to state that the meat supplied to the troops at this station, from the beginning of April,† to the end of August, was generally of inferior quality, and deficient in sustaining power, owing to the want of grass for cattle; and that the supply of vegetables was, for a great part of the same period, to a great extent limited to onions and pumpkins, the latter of which, being considered by the men of little use as an article of food, was sometimes looked upon with aversion, and often left uneaten, either from distaste, or from fear of its producing diarrhœa.

"To the defects in the rations here noticed, I attributed in part the feeble exsanguined appearance presented by a large proportion of the men during the last few months, as also in a certain degree the low asthenic symptoms observed in some cases of fever, and I thought it proper to recommend that four ounces of dholl—one of the pulses rich in nitrogen—should be issued twice a week to the European troops at the station, as a substitute for the ration of rice. I may add that this was the only suggestion available under the circumstances, for it was found impossible to supply meat of a better description, and all the exertions of the Brigadier Commanding failed to procure other kinds of vegetables, as potatoes, turnips, carrots, sweet potatoes, &c. Happily it was, however, immediately acted upon, and since the 1st of September the soldier has enjoyed and used with advantage, as pea-soup, curry, puddings, &c., this valuable and too much neglected article of food, which has at once the rare merit of compensating for the nitrogen deficient in the meat, and adding variety to the vegetable element of the diet."

It is probable that the specific cause of the disease will be referred by some

* Page 191.

† The period of the year during which the rations deteriorate in quality is subject to slight change, depending on difference of seasons; in one year the meat continues good up to the middle of May, in another it begins to want condition early in April.

to the overcrowding and defective conservancy arrangements now described, whatever secondary share in the results may be attributed to the nature of the food supplied to the troops, and I have therefore dwelt at more than usual length on these unsavoury subjects: but I have now to notice that predisposing cause existed in the composition of the regiment, and age of the men, and perhaps also in the climate itself. The regiment was made up of two classes—men who came out with the corps from the Mauritius (about 700 in number), who had passed a hot season in the country, and men who joined as recruits (350 in number) in October and November, 1858, and beginning of 1859, and who had not spent a hot season in India. The men of the latter class were especially obnoxious to fever, and two-thirds of the total deaths from that disease (11 in number) which occurred in 1859 were recorded among them, and the average age of the men who thus died was only 20 years and 6 months; moreover, we find that during the autumn months, when this fever was noticed, the number of admissions from fever among the recruits was nearly equal to that among the old soldiers, though the strength of the latter was to that of the former in the proportion of two to one. The proclivity to contract the disease thus shown by the young men of the corps was doubtless due in part to the fact that they were quite unseasoned in the country; but assuming the disease to be identical with typhoid fever, as observed in other places, it must have acknowledged the same or similar conditions for its cause, and it was only natural to expect that it should, in accordance with its usual habits, select the younger men of the regiment for its victims. Of the influence of climate, it is only possible to say that its extreme dryness, and absence of sudden atmospheric changes, secures for it a marked immunity from dysenteric affections, which, under similar conditions of life in other stations, would probably have covered a large share of the whole amount of morbid action, and thus have served as a mask to this disease, and that enteric lesions were noticed in a few cases unconnected with fever. That the tendency thus shown, however, to structural change in the small intestine, cannot be made of much account, as indicating a predisposing cause derived from climate, is evident from this, that length of residence did not render the occurrence of such cases more frequent, but the contrary; and it will be shown that no instances of this fever were presented in the regiment during the two subsequent years—1860 and 1861.

III.—Removal of Etiological Conditions: Results: Final Conclusions.

The conditions under which the disease took place having now been considered, it becomes a matter of interest to inquire in what particulars these conditions underwent change or improvement, and what difference, as expressed in disease, attended these altered circumstances. The facts elicited by this inquiry will be held, I think, to justify the tedious elaboration of the foregoing details, for they appear to me to be an eloquent and instructive commentary on these details—their necessary complement; and I am free to own that this paper would not have been written, if I did not consider them an indirect proof of the nature of the disease—a final test of the most efficient agencies concerned in its production, and a striking vindication of sanitary science. It is stated in the Transactions of the Medical and Physical Society of Bombay, for 1851–52, that fever is not only "the disease *par excellence* of Deesa," but that the mortality, in proportion to the number of cases treated, is greater than at the Presidency, and double that of Poona or Belgaum; that it amounts to 41·89 of the total mortality, and that more deaths occur from it at the station than from pulmonic affections, diarrhœa, dysentery, cholera, and hepatitis added together; and Dr. Hunter, 2nd (Queen's) Regiment, noticing the barracks at Deesa, in 1841–42 (at which time ten only were built), states that they are well adapted for the accommodation of 800 or 900 men, and observes—"By far the greater proportion of the sickness and mortality has been occasioned by fever and its sequels, and that chiefly of the gastro-enteric and gastro-hepatic species, or autumnal remittent," and further records the fact, that in one fatal case the cæcal valve was thick, fleshy, and ulcerated, and that in another ulcers were observed at the extremity of the ileum. Now, fever was by no means a very fatal disease in the regiment in 1859, even in presence of the conditions

above described ;* and we believe it will be made to appear, from the following statement, extremely probable, that fever, however prevalent it may be in the station, would naturally, and under favourable circumstances, prove a very mild, and by no means a fatal disease ; that the climate of Deesa, though an exhausting one, would in fact be remarkably exempt from all the ordinary forms of endemic disease so common in India, if the sanitary and hygienic conditions of the soldiers' life received all the improvements which they admit of. These are conclusions, however, which, if clearly proved, must manifestly possess some public importance ; nor is it improbable that the facts adduced may admit of more than local application, and I trust, therefore, I shall be excused for referring to this part of the subject at some length.

It will be collected from the previous remarks, that the immediate cause of the overcrowding of the barracks and regimental lines generally, was the return of the companies of Nuggur Parkur, on the 16th May, 1859, and the necessity of providing shelter for the married men, wives, and families, of the 83rd Regiment, who arrived from Nusseerabad in the beginning of the hot season. The latter occupied two of the patcherries, which would otherwise have afforded ample accommodation to 140 single men, and yet these patcherries were insufficient for their wants ; instead, however, of making over another patcherry for their use, which would only have further increased the pressure on the limited space available to the regiment, two large houses were hired at the public expense, and handed over to the families of the 83rd Regiment yet unprovided for—about 12 in number. In the beginning of July the new patcherry was finished, and placed at the disposal of the regiment, by the Engineer department ; but though it was desirable to remove the married men of the 83rd Regiment, with their families, into this building, for whose accommodation houses had been hired, it was a matter of still more urgent necessity to relieve the pressure on the barracks proper, and it was accordingly handed over, as already mentioned, to the men of the grenadier company. By this step the overcrowding was in part removed ; while the movements already mentioned, which took place subsequently, still further relieved the accommodation. On the 22nd November, 1859, the married men of the 83rd, and their families, left the station, *en route* to Belgaum, to join that corps, and no overcrowding was at all possible from that date to the present time, for since the return of the wing from Dwarka, the patcherries which were occupied by that detachment have been made available for the accommodation of the companies of the regiment, while time has reduced, in some degree, the strength of the corps itself. It is only necessary further to state, that tents were pitched in front of the barracks, to afford some relief at night to that overcrowding which was for a short time unavoidable ; that tents were put up in the hospital compound, for the use of the convalescents at night ; and that efforts were made, though without success, to share with the artillery their barrack accommodation, and to hire additional houses for the families of the 83rd Regiment, who occupied the regimental patcherries.

It will be easily conceived that the conservancy conditions we have described must have been the subject of verbal and written representations. On the 21st of February, 1859, my predecessor in the regiment—now Inspector-General of Hospitals—Dr. Muir, fully explained the radical imperfections of the cesspool and sewage system, proposed that it should be abolished, and that portable tin or iron vessels should be used as substitutes for the baskets, and that their contents should be removed night and morning in covered carts. On the 22nd April—12 days after I joined the regiment—I called attention to the dilapidated condition of the cesspools, and the state of the drains leading from the urinaries and ablution rooms, &c., and my suggestions, on this, as on all subsequent occasions, whether communicated verbally or officially, were, as far as possible, given prompt effect to. At this time, however, and as an effect of the mutiny, the relations of employment and labour were somewhat disturbed. Skilled

* It must not be supposed that these pages have been written to explain or illustrate any unusual mortality in the regiment, for during the nine months of 1859 to which they refer, only 25 men died, namely, 21 from endemic disease, and 4 from cholera ; the mortality of the whole year was, perhaps, rather below than above the average.

labour was with difficulty procured in the station, and nearly all the hands which could be obtained were employed on the patcherry, which was hurried on to completion, in order to enlarge the accommodation of the regiment. The sanction of the Government, moreover, was necessary to a change of system which involved expense, and could not be procured at once; and thus, while the cesspools, urinaries, and privies were undergoing monthly and daily repairs, while the greatest efforts were made to keep them in a clear, wholesome condition, the first effective relief to their unsatisfactory state was simply the result of the great reduction of strength which took place on the departure of the wing to Dwarka. At a later period, however, and shortly after the wing rejoined the regiment (in March, 1860), the system again presented many of its former objectionable features, for though 120 to 140 men were now accommodated in the patcherries, it could not expand or work efficiently as the strength increased, and the condition of the privies, &c., was again brought under notice. As a consequence of this representation, a Committee was assembled in April, 1860, to report on the system, which recommended that the urine troughs of masonry should be pulled down; that the drains from the urinaries to the cesspools should be closed up, and all communication of urinaries with cesspools cut off; that the urine shed should be provided with iron urinal vessels, and that the contents of the latter should be removed daily beyond cantonment limits, &c. These suggestions it was found at the time impossible to carry out; but at a later date the matter was again represented to the authorities, and the recommendations of the Committee assembled on this occasion received prompt attention. The urine troughs were removed; iron urinal vessels were placed in each of the urinary sheds; the cesspools were abolished; pits were sunk outside the ablution rooms, in which iron vessels were suspended to receive the waste water. Similar arrangements were made to receive the drainage from the privies; and iron vessels, in place of the baskets formerly in use, were sanctioned in all the barracks and patcherries. The new system thus adopted has been at work since the 8th of September, 1860,* and with the most satisfactory results; nor need any apprehension be felt regarding the future sanitary conditions of the lines, if provision be made for dammering these iron vessels, and a supply of them be kept on hand, to replace those which may in time become corroded, and leak.

It was found impossible, as already stated, to improve the quality of the rations, or obtain suitable vegetables for the men, during the autumn months of 1859; but owing to the representations submitted, and the anxiety and concern shown by the Brigadier Commanding on the subject, it is fair, perhaps, to presume that the Commissariat Department was better prepared to make adequate provision for the ensuing year; at all events, during the last two seasons, potatoes, sweet potatoes, were issued to the troops regularly, except in September and October, when the potatoes, having become old and bad, pumpkins, dhol, &c., were supplied as substitutes. Some improvement, moreover, was effected in the quality of the meat; and I find, in my annual report for the year ending 31st December, 1860, that the high sanitary and physical condition to which the men had attained is referred in a great measure to the superior quality of the rations, as compared with those of the previous year.

Having thus fully examined the conditions under which this fever was observed, explained the measures recommended for their removal and amendment, and stated the particulars in which the suggestions were carried out, we proceed, lastly, to note the results as expressed in disease. Our attention may be confined chiefly to the month of May, June, July, August, and September, for nearly all the mortality from endemic disease occurred in these months, and the fever of this type was not observed at any other period of the year. The facts are few, but striking and important.

In 1859 the average strength of the regiment in May, June, July, August, and September, was about 987. Eight men—all single men, and residents of the barracks proper—died from fever, in six of whom the autopsy disclosed the peculiar lesions elsewhere described, while a great many cases of a severe

* It is unsatisfactory to have to note, that in the interval which elapsed between the assembling of the two Committees above referred to, cholera appeared in the regiment, and carried off 24 men.

kind were received under treatment marked by the uncertain and protracted convalescence so characteristic of typhoid fever. During the same month, in 1860, the average strength was about 765 ; and two men died under the head of fever, one from secondary abscess of the neck exposing the spine, and producing fatal exhaustion, the other from dysenteric complication, attended with ulceration of large intestines, and there were very few instances of fever accompanied by serious symptoms. Lastly, in 1861, the average strength in these months was 870, and no casualty from fever occurred, nor did the disease present itself in any other form than that of the mild recurring intermittent type.

It may be further mentioned—for it seems worthy of some notice—that the number of deaths at Deesa, in 9 months of 1859, from endemic disease, was 21 ; in 12 months of 1860, 15 ; and in 13¼ months, ending 31st December, 1861, 1 only, and this the result of diarrhœa of long standing, contracted during the preceding year, at Mount Aboo.*

In former days these results would have been referred to difference of season, and the liability to disease incurred by the age, and the recent arrival in the country of the class of men which experienced the highest mortality ; but sanitary science is not entirely satisfied by such an explanation. It is doubtless true that the year 1859 was hotter than the two succeeding years ; the register of the thermometer kept at Deesa proves this, and it may in other particulars have been a more unhealthy year ; but if the nature of the season during these years fairly accounts for additional sickness and mortality in 1859, it will not explain the unusual structural lesions which formed the specific characters of this disease ; and it is a matter of fact, that the men of the European artillery who arrived at the station in June, 1859, and were provided throughout with ample barrack accommodation, enjoyed nearly as good, if not quite as good health that year, as either of the following years, and presented no examples of this kind of fever. Again, we cannot hesitate to admit, that age and length of residence in the country, determined, in a greater or less degree, the amount of sickness and mortality in these years ; but on the other hand, it may be very justly asked, why should disease among the young soldiers find its expression in this kind of fever, and has any connection been observed in other parts of India between length of residence in the country and the occurrence of a disease distinguished by morbid changes of this description? Without ignoring, then, the effects of age, length of residence in the country, and difference of season, which, as regards the two former, at least, would probably in any case have been considerable, it seems impossible not to admit, 1st, That these cases were true examples of "typhoid fever ;" 2nd, That the structural changes observed were the result of the special action of the unfavourable vital conditions noticed above, how much soever climate and other causes may have aided or modified their operation ; 3rd, That the disappearance of the disease, and the subsequent development of a high standard of the health (which has seldom been equalled, perhaps never surpassed, in India), were not the results of favourable season or acclimatization, so called, but are mainly to be referred to the improved conditions of life already described ; 4th, That the medical history of the regiment during the last three years, so far as it goes, supplies an illustration of sanitary science, and one which, perhaps, in the interest of the soldier, it might be well not only to remember, but to apply.

* I must not omit to state here, that one man who had been suffering at Deesa from chronic catarrh died at Aboo two months after he left Deesa somewhat suddenly, as I understand, and I believe from an attack of hæmoptysis, and that another man, who had previously never been in hospital in the country for more than trifling ailments, died at Aboo seven months after he left Deesa, from rapid collapse, while under treatment for intermittent fever, the cause of which was found in structural lesion or other changes, the result of disease contracted at some former period of life.

SPECIAL SANITARY AND TOPOGRAPHICAL REPORT ON KURRACHEE.

By Surgeon-Major Dr. Inglis, 64th Regiment.

Kurrachee may be described as the principal seaport of Scinde, and is situate at the north-west extremity of that province, and therefore of India; though geographically it is trans-India, and, properly speaking, not in India. A spur of the southern termination of the Hala range of mountains, extending towards Cape Monze, to the westward, bounds the station to the north-west; while at various distances, up to about seventy miles, the creeks and estuaries of the Indus extend to the south-east.

The port is very secure, being protected by Manora, a bluff point of the mainland projecting into the sea in a south-easterly direction, and facing another point (Clifton) distant about two miles to the eastward. Midway across, and between the two points of mainland, are two rocky islets, which appear at a remote period to have been disrupted from the coast by volcanic action. Manora is connected with the mainland to the west by a long narrow isthmus, separating the harbour from the sea on that side, and extending some miles round, rendering the headland only accessible from Kurrachee by boats. This point—which is elevated about 160 feet, on account of its dry, non-exhalent surface and semi-insular position—would make an admirable site for a sanatarium, were it not for the difficulty of procuring water, which has all to be conveyed across the harbour from Kurrachee, for the use of the few residents living on the headland, by the commissariat, and at a considerable expense. There is a bar at the entrance of the harbour, rendering it difficult of access to vessels of heavy draught, particularly during the prevalence of the south-west monsooni. The channel is marked between Manora and the islets already described.

The native town of Kurrachee, distant about a mile and a half from the camp, is at the end of the harbour and very much exposed, from the extensive tracts of mangrove, swamp, and sea mud laid bare at low water, to the influence of fœtid exhalations arising therefrom. It is connected with Kramaree, or the subsidiary port off which the shipping anchor, by means of a long wall-road, built through the swamp since the occupation of Scinde, and which greatly facilitates the conveyance of traffic to and from the vessels in the harbour. This town was formerly a most filthy locality, and no doubt was materially aiding in the sources which induced devastating choleraic visitations, particularly that of June 1846, which committed such havoc in the ranks of the regiment formerly stationed here. Since that period, however, the laws regulating health have been better attended to, and, owing to the rigid application of sanitary and municipal enactments, carried out in the city and parts external to the camp, by the Commissioner and civil power, and within cantonment limits by the military authorities, Kurrachee and its precincts have become comparatively free from endemic disease—the product of filth and decomposition of animal matter; and while the native town, from its order and superior state of cleanliness, has become worthy of imitation and example to other native cities, with a sensible and appreciable effect on the health of its inhabitants, the non-occurrence of a single case of cholera or small-pox, or of preventible disease in general, among the men constituting my own charge, since the regiment returned to Kurrachee, after some years' absence, entitle me to attribute the superior salubriety of this station and its environs to the great attention paid to sanitary measures.

Having made this digression, I shall proceed to finish my topographical description. I have described Kurrachee as the most westerly point of Her Majesty's Indian possessions; and as such it has been selected as the Indian landing-point of the telegraphic wire, which will shortly place India in direct electric communication with England. Kurrachee is situate in latitude 24° 51′ and longitude 67° 2′. Its geographical position, in a military-political point of view, is one of the most important in the East, and, among other

desiderata, the circumstance of being over two hundred miles nearer Suez than its great rival seaport, Bombay is, in time must tell to the advantage of Kurrachee; not to mention the facilities afforded for the transmission of troops and supplies, by means of the Indus, to the Punjaub and northern provinces of Hindostan, to which it is now the acknowledged route; and on the completion of the line of railway to Kotree these advantages will be materially enhanced. The route down the Indus, for the passage of invalids homewards, has also completely superseded the long and tedious one *viâ* Calcutta, and many a valuable soldier, at the recommendation of Medical Boards, ordered home for change of climate, has been preserved to the service by the greater expedition and comfort of the Indus-route, compared with the other most harassing and detrimental one to invalids, which involved a long march through the Bengal Presidency.

The soil in the vicinity of Kurrachee is chiefly calcareous sand or grit, and the country all round the station, except to the west of the cantonment, where the Government Gardens are situated, is exceedingly desolate and barren. In the vicinity of the cantonments are immense sandstone quarries, from whence the stone for building the station has been obtained. These quarries prove of vast utility, combined with saving of expense, in affording material for the construction of the railway workshops and buildings now in progress at this terminus; while it also affords the means of ballasting the line—of itself a matter of much importance. The rocks of Manora are composed of fossilized coral, resting on sandstone. West of Kurrachee, about nine miles, the hills are of lime; in the vicinity are several hot springs, originating in limestone, the water of which is collected in a swampy tank, full of crocodiles, which are under the guardianship of some Mahommedan Faqueers. The hot springs at Mugger Peer, just described, have afforded suggestions for the establishment of a sanatarium for the treatment of rheumatic, syphilitic, and other chronic affections; but if the idea is conceived on the hypothesis that the water issuing from the springs is impregnated with sulphur, or other mineral compounds supposed to have a sanative influence, it is untenable, the water being very pure, destitute of smell, and tasteless, deriving its heat, which is its chief recommendation, from the great depth it springs from. The natives, however, regard Mugger Peer as a holy place, and flock to it in great numbers, on account of the supposed curative virtues of the waters.

The water supplied by the wells in that portion of the cantonment occupied by the European troops is, in general, brackish and full of marine impregnations, and quite unfit for domestic use. The troops are, in consequence, supplied from wells at the north-western end of the camp, where the Government gardens are situated, and which is the only alluvial land in the neighbourhood. At present this water-supply is limited, having to be conveyed to the barracks and hospitals, by means of casks mounted on carts, by the Commissariat. The supply, however, is very liberal; amounting, for all purposes, to eight gallons per diem for each man, woman, and child. The large plunge or swimming bath in the lines, for the use of the soldiers, is filled from a well close by, the water of which is saline. This appears to me to be no disadvantage for bathing purposes, though it is stated that an officer in medical charge of one of the regiments of the local European army formerly quartered here objected to the water, even for ablution, on the plea that it affected the skins of his men, and developed a proclivity for boils—an objection, I must state, I cannot, from experience of its effects on the persons of the soldiers of the 64th Regiment, at least, confirm. It is under consideration, and I believe a sum of money has been set aside by Government for the purpose to bring water from the other end of the camp (from the same well as supplies that required for economic purposes) for the plunge-bath too, and to discontinue the brackish water at present used; and this project is to be carried into effect by means of glazed earthenware pipes. A bounteous and good supply of water is the great want of this station, and the plan of remedy has for a length of time afforded much local discussion and excitement. There is no doubt but in time an aqueduct from one of the tributaries of the Indus, some distance inland, will supply the deficiency; and a local municipal enactment for raising the means of carrying out the proposition by a tax, to be levied in and out of the cantonments, is all but promulgated.

The camp to which I have only made passing allusion is the military cantonment of Kurrachee, and extends about two miles, in a line running from south-east to north-west, parallel to the sea, and distant from it on an average about a mile and a half, the native town being equally far off; while the landing-place in the harbour at Kramaree is fully three and a half miles from the most distant or Clifton end of the cantonments. The left of the camp faces landwards or north, and rests on the alluvial tract I have already noticed as being the site of the Government Gardens, and from whence the best water is procurable. There is a good deal of cultivation on this flank, the Parsee inhabitants and other natives having their country residence here. It is at this side the native troops are chiefly hutted. About the middle of the camp is situate the Sudder Bazaar, consisting of several streets occupied by native shopkeepers, tradespeople, and settlers of every kind; the Artillery Barracks, arsenal, depôt for recruits and invalids passing to and from the Punjaub are also in this locality. The lines occupied by the European Corps (late 11th E. I. Co.'s) quartered at Kurrachee also occupy the centre of the cantonments.

The lines of my own regiment are on the extreme right of the camp, when looking towards the land, and have the sanatarium of Ghizree and Clifton to the south. In this description of the camp, with reference to its right and left, I am describing, according to the rules of castrametation observed in pitching our ordinary camp, and which are also generally adopted in laying out a military cantonment in India, wherein the soldiers' tents or barracks form the front of the lines, those of the officers being arranged in rear; under this view, then, the soldiers' barracks at Kurrachee face the land, the officers' bungalows being between them and the sea. It is not to be presumed, however, from this that the hygeian influence of the sea breeze has been lost sight of in the laying out of the barracks I am now going to describe. They are so arranged that the full effect of the benign south-west monsoon during the hot months, when it prevails, is freely obtained in each barrack-room. The situation of the European barracks at the end of the camp, occupied by the 64th Regiment, may be described as on a sandy plain, over which at no very remote period the ebb and flow of the tide must have taken place. It is very open, and, from the calcareous nature of the soil and consequent absence of vegetation, healthy. Opposite the camp to its sea-face, is a wide expanse of muddy sand, extending from Clifton towards the harbour, and which partakes of the nature of the swamp already alluded to as existing near the town. The sea obtains access to this waste by means of a breach in the sandy spit, which would otherwise connect Clifton with Kramaree. At low water the exhalations from this waste are not very pleasant, but being from marine decomposition are pronounced not to be injurious to the sanitary state of the troops—a fact which the statistics of the station seem to corroborate. It was under consideration to shut out the sea at the narrow point of ingress to this lagoon, for the combined desiderata of acquiring land and deepening the bar at the entrance of the harbour by the extra volume of water the tide would direct through the regular channel by this exclusion, while it was also conceived that a beneficial sanitary effect would result by the dessication of the substances which at low water are so redolent of unpleasant exhalations. This project has, I am told, been abandoned for engineering reasons, chiefly grounded, I believe, on the expense it would involve.

I have hinted aleady at the great care taken at Kurrachee, both external to and within the cantonments, to maintain the health of all the inhabitants and troops, by the most strict adherence to sanitary regulations. All the refuse accumulations, including manure and stable litter of every kind, the sweeping of bazaars, barracks, hospitals, and private dwellings, are carefully carried off every day and destroyed by fire in huge furnaces, erected for the purpose, at spots distant and, with reference to the prevailing direction of the wind, to leeward of the camp.

Having concluded the general topograpical history of the station and its environs, inasmuch as may be considered necessary, it now devolves upon me to give some description of the several buildings appropriated for the barrack and hospital accommodation of the troops under my medical charge, and which a reference to the accompanying sketches will aid.

The new barracks of Kurrachee were finished in 1853, the regiment first destined to occupy them being the 64th, which, after an absence of about six years in other stations, with a long interval of employment in the field, returned in April 1859 to its old quarters. I may mention, however, that the new hospital was not finished when the 64th was last at Kurrachee. The whole are constructed of the substantial sandstone already described in the short physical remarks given, as abounding in the neighbourhood, and they are admirably suitable for the purpose intended, and may be pronounced as among the most perfect barracks as yet built in India; affording a favourable contrast to the old pendals and barracks occupied at present by one of the local European corps and as the depôt for the troops employed in the north of India, which barracks decidedly fall short of what is required for the accommodation of European soldiers in this country.

The new barracks are in two lines: that facing the sea, consisting of six, and the landward of four chief blocks of building. In advance of the first line, nearer the sea and between the barracks and officers' houses, are the canteen, ball court, orderly room, and armourer's workshop; while to the north, or land side, of the whole, and therefore to leeward, with reference to the prevailing direction of the wind, are the men's latrines and workshops. In the same vicinity, but beyond the influence of the latrines, are the schoolhouse, regimental cells, and patcheries, or quarters for the accommodation of the married men and their families. The hospital is quite isolated from all, and will be described hereafter. The sergeants' mess, the plunge-bath, quarter-guard, quarter-master's stores, sergeant-major and quarter-master-sergeant's quarters, aid in filling up the space in the second line, in which there are only four barracks. There are, then, ten distinct blocks of building for the service of the soldiers, each of which, for the sake of ventilation, is isolated, having a clear intervening space of about 120 feet separating it from its fellows on either flank. Each barrack has also on its land-rear the lavatory, urinary, and cook-house, for the use of its own inmates. At the ends of each block are rooms for the accommodation of the sergeants of the company quartered in the building; and, corresponding to each sergeant's quarter, is a cookhouse and necessary for the same. The two lines with reference to each other are in eschelon, so as to secure the full influence of the sea breezes which prevail here eight months of the year. Each room is 278 feet long within the walls, is about 22 feet high, and 24 feet wide, exclusive of the end rooms, which are occupied by the non-commissioned officers.

There are twenty-five doors on each side, with one at either end, in all fifty-two; each door is $9\frac{1}{2}$ feet high, exclusive of a window on its summit; corresponding in breadth to the door, the window is 18 inches high, and turns on a pivot for ventilation. A verandah, with its roof joining the wall, about 4 feet beneath that of the building, runs all round. This verandah is $11\frac{1}{2}$ feet wide, and affords space for exercise out of the sun's rays. The verandahs are used, also, occasionally for eating in, at breakfast and dinner, as being cooler at certain seasons than the interior of the building. Ventilation is further aided by a row of six large ventilators along the ridge of the roof, as well as by Venetians between the roof of the verandah and that of the building in number corresponding to the doors; above which, also, they are situated. The roof of each building is wooden, protected from the weather by tiles. The floor is raised about 3 feet, and flagged. There are hanging iron shelves in each barrack, running the entire length of the room, on which the men keep their kit secure from the ravages of white ants and other vermin. There are also at the sides racks for the arms, which aid materially in affording space and towards maintaining the neat and clean appearance of the rooms.

It is evident from what I have stated that the ventilation of each barrack is as perfect as possible; while, owing to the numerous apertures by which the pure air gains access, and the means by which the vitiated atmosphere obtains egress, it is obvious nothing deleterious to health in this respect is in existence.

The dimensions of each barrack-room within the walls are, as stated, in length 278 feet, breadth 24 feet, and in altitude 22 feet, affording space for 146,784 cubic feet; and, as each room is constructed for the accommodation of a hundred men, it follows that every soldier, even if the room contains

the number allotted by regulation, has 1,467 cubic feet of air to respire This, however, is the least estimate, for the strength of every room is considerably diminished by men on duty, in hospital, &c.; so that the space for respiration is always much over what I have given, and, considering the adventitious aids for securing free ventilation, it must be conceded that in this respect the barracks are very perfect.

I have alluded to there being six ventilators arranged on the roof of each building: perhaps it would have been better had these barracks, admitted to be so good, been rendered more perfect by the construction of continuous ventilators, which would also have confirmed the advantage of a double roof to each building. It has also been suggested that they might have been constructed on arches, with upper rooms for the men to sleep in, the lower ones to be appropriated for eating, working, and amusement, as in the case of the neighbouring barracks for the troops of the Horse-Artillery, and which no doubt are very perfect, and afford excellent models of what soldiers' quarters should be in India.

Out-buildings.—In connection with each barrack I have already adverted to these adjuncts towards the comfort of the soldier. It is difficult, with reference to convenience and health, to arrange at what distance they should be constructed from each room: if too far off, the men are exposed to danger from the solar influence in getting to them; if too close, they may exhale odours productive of disease. It is to be seen how these difficulties have been obviated; and, in the first place, the lavatories and urinaries may be briefly noticed. By a reference to the accompanying ground-plan, the position of these important out-offices can at once be made out, and each may be described in a general way as in rear and to leeward of the centre of its corresponding barrack, and very close up to it also; so as, in the case of the urinary, to afford no inducement to the commission of nuisance. The lavatory is 27 feet by 14 feet, is copiously supplied with water-casks and tubs, is approached by a flight of steps, and is at such an elevation that the used water drains to its corresponding urinary situate on the reverse side, and, washing through each compartment, carries off all the consequently diluted urine to a cesspool, which is, for further security, likewise cleaned out daily, the refuse being taken right away and destroyed. Quick-lime is also freely used as a deodorant; so that, combined with cleanliness and drainage, no unpleasant smells pervade the rooms. Further off, to the rear of each barrack, is its cookhouse, amply fitted up for the culinary comfort of the men. The refuse from this building is also frequently removed; but, as the soldier in this country is not required to prepare his own food, and not liable to exposure either in having it taken to him at meal-time, I have nothing further to say, except that these out-offices correspond in every way in excellence with the barracks.

At the flanks of each building, and at convenient distances from their rooms, the non-commissioned officers have latrines, lavatories, and cook-houses, with cesspools attached, for their own exclusive use; all constructed on a similar scale of convenience, and the accumulations from which are regularly removed.

Latrines.—The great difficulty in barracks is to arrange these buildings at a distance not too inconvenient for the men, and at the same time sufficiently far removed as not to be sources of sanitary inconvenience. It will be perceived, by a reference to the ground-plan, that they are four in number, large, and well to leeward of both lines of barracks; and, as the ordure is regularly removed, quick-lime and other deodorants freely used to neutralize effluvia, they are not offensive to the inmates of the barracks.

The schoolhouse, the position of which can be seen by a reference to the plan, is a large commodious building, divided into two rooms for the separate instruction of the adult scholars and boys and girls of the regiment, with appropriate accommodation for the teachers of both sexes. The altitude of the building, ventilation, and other desiderata, are on the same scale of perfection as mentioned in my description of the lines. The school is well away from the barracks; but its situation, for the convenience of the children, is in close vicinity to the patcheries, in which the married men and their families reside.

The canteen, ball-court, and orderly-room are situate to the sea-face of the

barracks; are all, in their construction, ample and commodious, and partaking of the general superior character of the barracks; but, as neither the canteen, orderly-room, or armourer's shop, as mere buildings, have any great sanitary influence on the soldier, a critical description of their dimensions may not, as in the case of a barrack-room, be considered necessary. Regarding the canteen, the men are not permitted to remain in it any length of time—merely drawing their allowance of spirits or malt liquor, and retiring; and the orderly-room is where the official duty of the regiment is carried on. The position of all these buildings is indicated in the plan.

The quarter-guard, an important building as connected with the discipline of the corps, occupies the centre of the north or landward line, and is, in common with the others, a fine commodious building. Its dimensions are—in length 66 feet, altitude 22 feet, and breadth 24 feet. It has twelve double doors, one being composed of iron bars, for security and admission of air. These doors are about 12 feet high; surmounting each, there is a Venetian window, for light and admission of air, with the usual ventilating apparatus along the ridge. The floor is elevated, and flagged with stone, similar to the barrack-rooms.

There is no common guard-room sleeping-place, each man having his own separate tressels on which to arrange his bedding.

The plunge-bath, to which I have already alluded, and whose position is clearly defined in the ground-plan, with the well from which the water to fill it is obtained, is a building constructed in every respect so as to secure perfect immunity from sun and weather, with every regard to privacy. Its dimensions are—in length 50 feet, breadth 17 feet, and depth 7 feet 4 inches. The water is frequently changed, and themen have free access to it from sunrise to 9 A.M., and from 3 or 4 P.M. (according to season) until sunset. During the extreme heat of the day it is closed, to obviate the danger of exposure to solar influence in going and returning from it to the various barracks, and also to avoid other dangers which bathing at such times may be productive of. It is also shut up at night, for reasons which can be appreciated. To preserve order, and guard against the commission of nuisance by evil-disposed individuals, two men of the regimental police are in attendance while the bath is open. The sanitary advantages attending the frequent immersion of the person, with regularity in the performance of ablutions in hot countries, cannot be over estimated; and it is a pity there is not another plunge-bath of similar size. For a strong regiment and extent of the lines, one is not enough. It is also a subject of regret that there is no large bathing or washing-house for the general use of the women and children.

The patcheries for the accommodation of the families consist of four separate rows of quarters, distant on an average about five hundred yards from the nearest barrack, and midway between them and the Regimental Hospital. They are situated on a ridge slightly elevated, the site being selected evidently with a view of good drainage and salubrity; and, being handsomely built and comfortable structures, they form very seemly appendages to the general appearance of the barracks. Though considerably to the landward of the barracks, they have a general south-west exposure; so that they derive every advantage of the sea-breeze. Collectively, they are arranged for the occupation of a hundred families, and divided into four blocks so arranged that one does not interfere with the other in the way of ventilation. Along the front of each block there is a continuous verandah, in which the children can take exercise without exposure to the weather. Each family has a distinct isolated dwelling, consisting of two rooms, very lofty, with a large roof-ventilator. The centre wall, separating the rooms, only runs half-way up, so as not to interrupt the free circulation of air. As adjuncts to the general comfort of these quarters, and with a considerate regard for the decency and privacy of the inmates, each quarter has a separate bathing-room, cookhouse, and latrine.

The health of the women and children of the regiment, since its arrival at Kurrachee, has on the whole been very good, and the mortality in proportion very small, which in a great measure must be attributed to the excellent accommodation set apart for them and the healthy situation of their habitations

The cells of the regiment partake of the general excellent character of the other buildings. Like the patcheries, they are considerably removed from the barracks, and consequently have not been taken into the annexed ground-plan. Their situation is to the landward side of the barracks, in line with, but to the right of the patcheries, looking towards the sea or south-west. They are, however, sufficiently far distant from the dwelling of the families as not to be productive of any annoyance.

The cells consist of three small blocks within a compound, divided by a substantial wooden railing, external to which is the guard-room. Each block consists of four separate cells, each 9 feet 7 inches square, having a double roof, the external superior one being on the principle of a ventilator. The height of the cells to the first roof, half of which is open canework, for the free circulation of air, with the space above, is 11 feet. The door is double—one of iron bars and the other of wood; corresponding with the door, and above it is a grating-window. To admit fresh air, and obviate the effects of a vitiated atmosphere, the wood door (except in very cold weather) is open. Surrounding each building, in the manner described in the construction of the barrack, is a verandah. The floors constitute, in my opinion, the most objectionable portions of the cells: instead of being flagged, as in the case of the other buildings, they are mud, plastered from time to time with a certain composition. In other respects the floors are well raised.

Hospital.—This building is one of the finest, and best constructed for the purpose, I have seen during a prolonged sojourn in India. It is situate on the left flank of the lines, and, with reference to their sea-front, to the rear and inland, and distant about six hundred yards from the nearest barrack. It consequently occupies an open, dry, isolated, and somewhat elevated position, having a free and unobstructed exposure to the prevailing sea-breeze. I append a sketch, for which I am indebted to the kindness of Lieutenant Haldane, of the 64th Regiment. It conveys an excellent idea of the front view and general appearance of this superior regimental hospital. Its situation, so perfectly detached from all other works, may be called suburban; and is distinguished by such salubrity that the hospital of itself may be regarded as a sanatarium, and conferring the advantages of change of air to its inmates. It owes this more to position than actual distance, for it is of easy access from the lines even in cases of emergency. This desideratum, however, does not extend to the officers' lines, from which, for the convenience of the Medical Staff, the hospital is too distant. On the occurrence of sudden and otherwise emergent cases, this disadvantage is apparent; for, of necessity, a considerable time must elapse ere the Medical Officer on duty, even if in his own house, can be communicated with. To obviate the danger likely to occur under such circumstances, I would suggest that a suitable quarter for an Assistant-Surgeon be constructed close to the hospital compound. This should be the official residence of the Regimental Orderly Medical Officer of the week, whose duty is to be within call for all emergencies. The hospital is inclosed within a wooden railing compound, including all attached buildings, such as latrines, store-rooms, straw-go-down, dead-house, cook-rooms, bathing and washing-rooms, quarters for the medical subordinates, dispensary, surgery, and guard-room. With exception of the guard-room, the out-offices just mentioned are to the rear and right flank. To the left of the regimental or principal hospital, within a continuation of the same railed-in space, but separated from it by a dividing wooden railing, is that set apart for the accommodation of the sick women and children, with all the requisite out-offices and quarters for two matrons.

The principal hospital is an oblong building, having a front of 331 feet, its breadth (including verandah) being 52 feet. At the left end is the quarter for the hospital sergeant; on the right, the surgery, office, and apothecary's store. The building is divided into three wards on the ground-floor, the centre being surmounted by an upper storey, affording space for an excellent upper ward. The two end wards are identical in dimensions, each being 90 feet in length, 24 feet wide, and in altitude 18 feet. The centre ward, below, is in some respects larger, being 99 feet long by 24 feet in breadth; but, from the circumstance of the upper ward being constructed over it, the altitude is only 16 feet. The upper ward alluded to is of similar dimensions as the last

influence of the monsoon, are certainly most numerous in May, June, July, August, and September, the highest number of treated being in June, which shows that the increase and decrease in admissions are materially influenced by the rise and fall of the mean temperature, barometrical pressure, and other meteorological influences; but, as I have stated, the regiment has not been sufficiently long located here to enable me to venture too far into this interesting subject. The chief ailments from April, the date of arrival of the whole corps in Scinde, have been chiefly as connected with climatic fevers of the periodic forms, but ephemeral and easily influenced by quinine and the ordinary remedial agents. Affections of the bowels, for the most part diarrhœa, but occasionally dysentery of a severe form, with hepatic complications, pulmonic affections not uncommon and occasionally of an ungent nature, and rheumatism in its various forms, furnish many subjects for medical treatment. As the cold weather approaches, pulmonic affections increase with more aggravated symptoms, some cases of pleuritis and pneumonia occurring. The type of fever often becomes continued, low, and typhoid, at this season, its characteristic, but not seriously so. Dysentery nearly disappears, but diarrhœa and hepatic congestions are common, as already stated. I had no admissions, since the regiment reached Kurrachee, from epidemic cholera, from any of the eruptive fevers, or insolation.

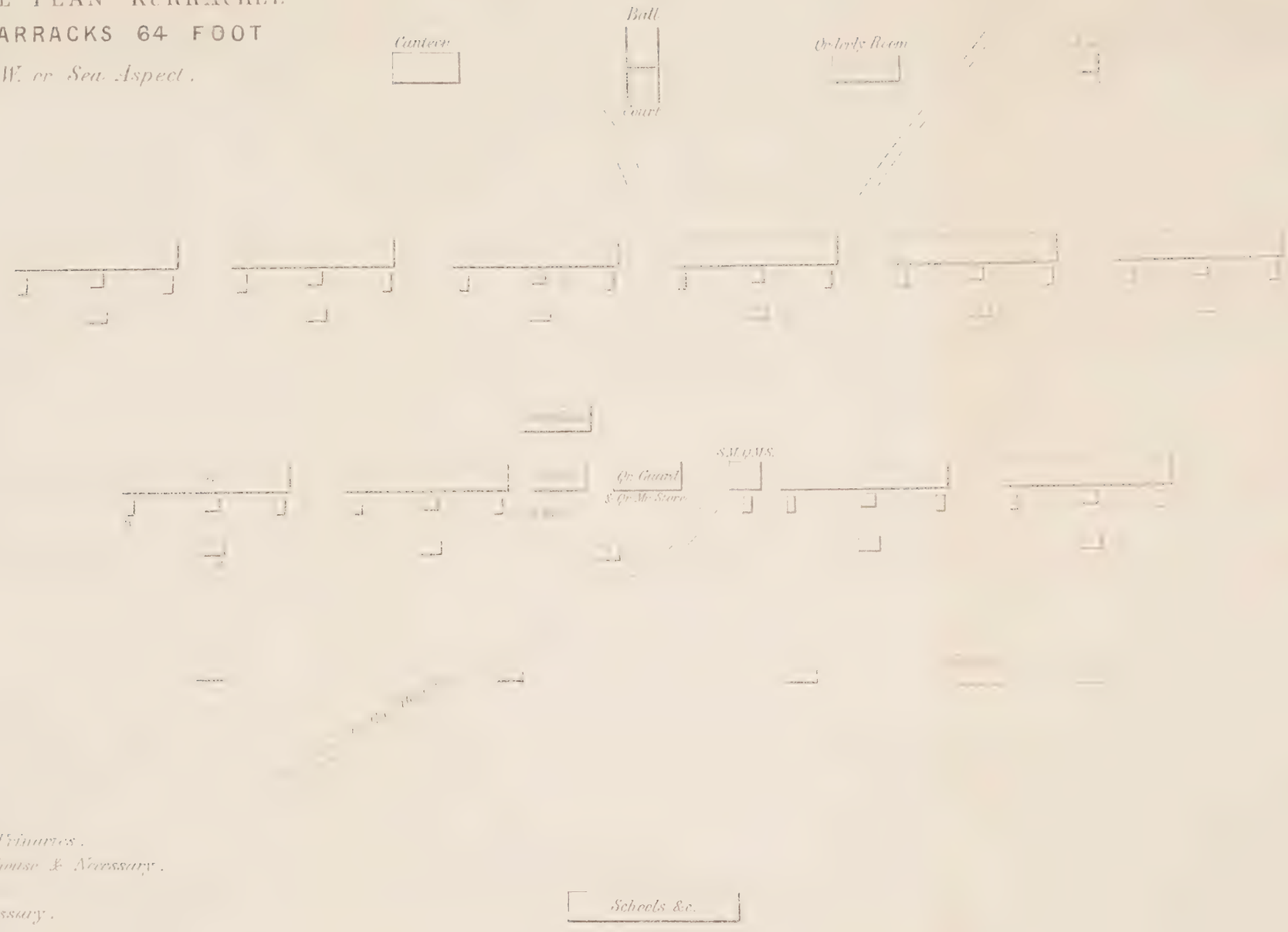
To the east of the station, towards Ghizree (the monsoon port of the Indus flotilla), and occupying an elevated position, commanding a good view of the sea, is situated a sanatarium, which is freely, and often advantageously made use of to afford the benefit of change to convalescents recovering from febrile or hepatic attacks. Ghizree is fully two miles off, and perfectly isolated, so that the atmosphere is quite pure and unvitiated, and, on the whole, removal to it for the purposes sought after may be pronounced beneficial and salutary. Rheumatic cases, however, especially such as depend on constitutional or syphilitic taint, should not be sent to Ghizree, as, instead of deriving benefit by the change, men affected in this way generally return to the regimental hospital with aggravation of their symptoms; these effects being ascribed to the exposed situation of the sanatarium, and the greater amount of vapour in the atmosphere owing to its comparative proximity to the sea.

In concluding this report, I have to apologise for imperfections. I trust, however, the sketches of the barracks and hospitals, and abstract of meteorological observations for last year, which accompany it, may have the effect in some measure of supplying the want of detail, which would have been made more perfect had longer residence in the station enabled me, from personal observation and full inquiry, to collect and afford data of higher value in elucidation of the medical statistics and topography of Kurrachee.

GENERAL PLAN KURRACHEE

NEW BARRACKS 64 FOOT

S.W. or Sea Aspect.



B. Barrack
L. Lavatory & Urinaries.
W. do. Cookhouse & Necessary.
C.H. Cookhouse.
P. Men's Necessary.

Schools &c.

HOSPITAL KURRACHEE,

NEW BARRACKS, OCCUPIED BY THE 64TH FOOT,

Proper Front facing the Sea. S.W.

1 Hospital
2 Female Hospital
3 Dispensary & Store Rooms
4 Subordinates Quarters
5 Meteorological Observatory
6 Guard Room.

C. Hallard Lt. 64th F. del.

Sketch of the

NEW INFANTRY BARRACKS KURRACHEE,

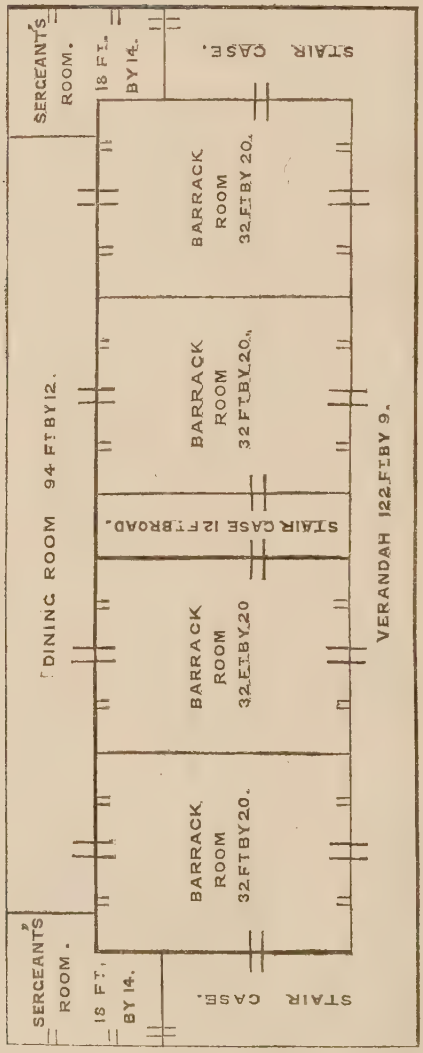
OCCUPIED BY THE 64TH FOOT.

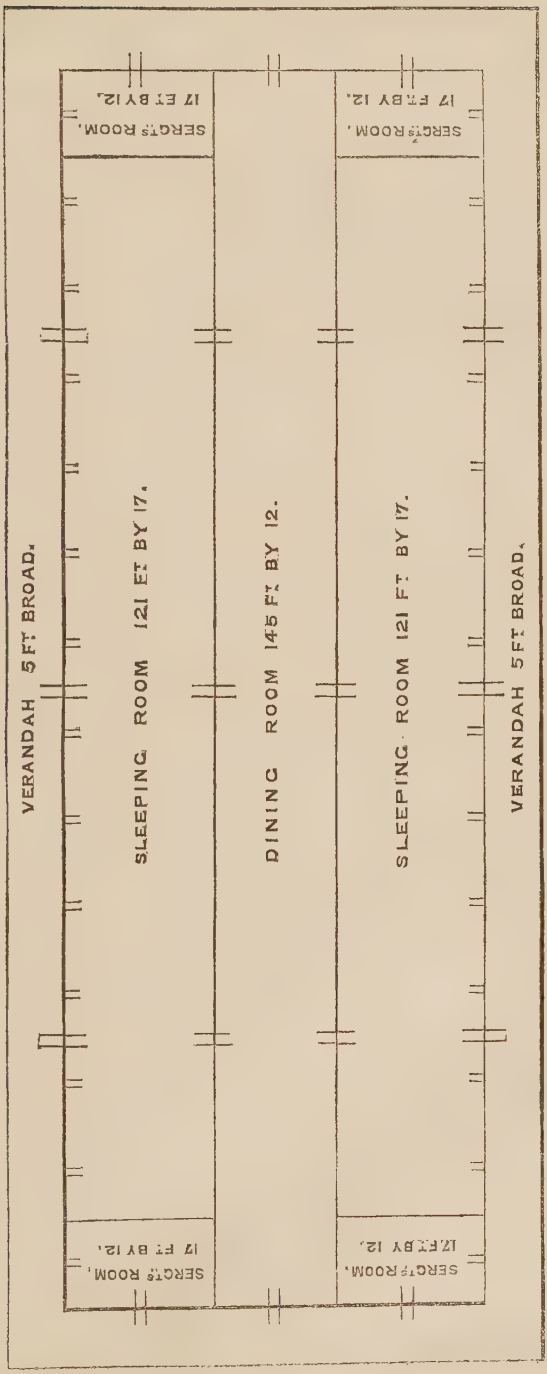
S.W. or Sea Front.

Day & Son. Lith.rs to the Queen.

ABSTRACT from Meteorological Observations, Hospital Observatory, Kurrachee, during the year 1859. Latitude N. 24° 47′ 19″; Longitude 67° 2′ E.

	Barometer No.			Hygrometer.				Self-registering Thermometer.								Rain in previous 24 hours		Remarks.
	Barometer No. Reading.	Attached Thermometer.	Corrected for Error Capillary Action Temperature of 32°.	Temperature of Dew Point Computed.	Elastic Force of Vapour.	Humidity.	Direction.	Maximum in Sun's Rays.	Minimum on Grass.	Maximum in Air.	Minimum in Air.	Mean in Air.	Maximum Wet	Minimum Wet.	Mean Wet.	On Ground.	Feet above Ground.	
	9½ A.M.	Mean.	3½ P.M.	°	°	°		°	°		°	°	°	°	°			
January 2 ...	30·174	30·110	30·047	{54·84 / 51·18}	0·401	0·549	E.	88·71	48·52	75·57	51·96	63·76	60·76	47·94	54·35	None.	None.	Dew points not observable for several days.
February 4 ...	30·137	30·074	30·012	{54·53 / 51·99}	0·482	0·511	E.N.	95·27	50·78	79·10	54·26	66·18	63·35	49·00	56·17	,,	,,	Some rain on the 21st. Ditto ditto.
March 6 ...	30·022	29·968	29·915	{61·43 / 58·27}	0·514	0·560	W.N.	99·30	58·06	84·30	61·17	72·73	68·60	57·26	62·93	0·02	,,	Some rain on the 11th. Ditto ditto.
April 8... ...	29·941	29·893	29·847	{67·61 / 64·48}	0·625	0·537	W.	107·34	67·25	90·61	70·01	80·31	74·51	67·75	71·13	None.	,,	Heavy dews.
May 10 ...	29·902	29·858	29·815	{74·45 / 74·35}	0·839	0·694	W.	104·29	75·50	89·50	76·22	82·86	80·01	74·11	77·06	,,	,,	Weather agreeable.
June 12 ...	29·684	29·645	29·607	{76·47 / 76·97}	0·880	0·671	W.	108·69	82·14	94·77	82·26	88·51	82·84	77·53	80·18	,,	,,	Weather sultry; some days dusty.
July 14 ...	29·696	29·659	29·623	{76·30 / 75·46}	0·866	0·703	W	101·71	80·28	91·50	79·52	85·51	81·50	75·24	78·37	4·90	,,	Rain in the latter end, and dust at the end of month.
August 16 ...	29·806	29·769	29·732	{72·72 / 73·21}	0·809	0·731	W.	95·28	75·30	86·72	76·56	81·64	78·37	73·15	75·76	None.	..	Weather agreeable.
September 18	29·911	29·871	29·832	{72·35 / 72·43}	0·786	0·797	W.	102·86	74·84	86·78	75·85	81·30	77·21	72·71	74·97	1·08	,,	Several rainy days in the beginning of the month.
October 20 ...	30·056	30·014	29·973	{70·24 / 70·40}	0·744	0·689	W.	105·85	68·79	86·69	70·42	78·55	77·01	67·93	72·47	None.	,,	Hot during the days.
November 22	30·171	30·119	30·067	{57·33 / 56·58}	0·400	0·483	N.	110·89	58·41	86·68	59·08	72·88	67·17	56·41	61·79	,,	,,	Ditto.
December 24	30·264	30·216	30·168	{55·52 / 47·02}	0·357	0·489	E.	98·61	49·33	75·74	49·45	62·59	58·89	46·71	52·80	0·20	,,	Rain on the 22nd; dew points not observable for several days.
Means for the Year... ...	...	29·935	...	{66·31 / 64·36}	0·648	0·617	...	Extreme range of temperature. 83·63 — 101·50 | 65·76		...	...	76·41	...	...	59·83	6·20	,,	


SERGEANT'S ROOM.
18 FT. BY 14.
STAIR CASE.
BARRACK ROOM 32 FT BY 20.
BARRACK ROOM 32 FT BY 20.
DINING ROOM 94 FT BY 12.
STAIR CASE 12 FT BROAD.
BARRACK ROOM 32 FT BY 20
VERANDAH 122 FT BY 9.
BARRACK ROOM 32 FT BY 20.
SERGEANT'S ROOM.
18 FT. BY 14.
STAIR CASE.


VERANDAH 5 FT. BROAD.
SLEEPING ROOM 121 FT. BY 17.
DINING ROOM 145 FT. BY 12.
SLEEPING ROOM 121 FT. BY 17.
VERANDAH 5 FT. BROAD.
SERGT'S ROOM, 17 FT BY 12.
SERGT'S ROOM, 17 FT BY 12.
SERGT'S ROOM, 17 FT BY 12.
SERGT'S ROOM, 17 FT BY 12.

TOPOGRAPHICAL AND SANITARY REPORT ON SUBATHOO (A LOWER HIMALAYAN STATION).

By DR. MUNRO, Surgeon, 93rd Highlanders. 1859–60.

THE Station of Subathoo is situated on a small range of hills running nearly north and south, and apparently a continuation of the same range on which Dugshai stands. On either side, east or west, this ridge is enclosed by deep valleys, which commence beyond the north end of Subathoo, and run, in a semicircular sweep, to a short distance beyond Dugshai, where they appear to meet.

The Subathoo ridge slopes down on both sides into these valleys, and is intersected by many watercourses, which act as drains, conveying all surface-water into the valleys below.

The space occupied by the station does not exceed a square mile. At the southern extremity lie the barracks and hospitals; in the centre is the parade-ground, surrounded by the bazaar, commissariat buildings, several other public buildings and private bungalows; and at the north end are officers' bungalows and several private houses.

Every barrack, house, or building is situated either on the top of small eminences or on spots excavated and levelled on the sides of the main ridge; the only piece of naturally level ground being the common parade.

The barracks intended for the troops consist of ten separate mud (or *cucha*) buildings, situated partly on the side of the hill and partly along the crest of the lower portion of the same hill. They are not built with any regularity, but suited to the nature of the ground on which each particular building stands. Some run north and south, some east and west, and at the north end of the range several are so grouped together as to interfere with the free circulation of air around them.

Each of the ten buildings consists of three separate compartments, all communicating with each other. The two lateral ones are used as sleeping apartments, and the centre as a dining-room. A narrow verandah (five feet broad) surrounds each building, and the only means of ventilation are the doors and windows. Each compartment has a distinct roof; the two lateral ones have double angular roofs, all covered in with wooden shingles; the central roof is flat; and in the upper part of the walls of this centre room, which are higher than the eaves of the lateral compartments, are openings fitted with Venetian blinds, which open externally, and produce to a certain extent a current of air if windows and doors are left open.

After my arrival, holes were opened at the bottom of the walls all round each building, and wooden gratings fitted into them; and in the wooden ceiling of each lateral compartment openings were also made; and the intention was to have cut ridge-ventilators, so as to complete the ventilation from below upwards; but this latter portion of the work was temporarily put a stop to. I was in hopes, however, that before the advent of another hot season, the whole alteration would be completed.

Each barrack is 145 feet long, and the aggregate space of the three compartments is 56,000 cubit feet; allowing, at the rate of 70 men per room, 800 cubic feet each. In each barrack there is a cook-house and latrine, both at some little distance from the main buildings, and there are three ablution-houses at the north end of the barracks.

The hospital for the men is a fine large building, situated on a spur projecting from the south end of the main ridge, and so placed that wind from every quarter can reach it. It is double-storied, with fine large spacious double verandahs; consists of twelve rooms, all opening into each other, and which together are capable of containing a hundred men. At the southern extremities of the lower verandah are two good ablution rooms, fitted with tables, basins, and slipper-baths; and detached, but communicating by a covered staircase, is one of the best constructed latrines I have ever seen. Close to the regimental is the female hospital—a nice neat bungalow, divided into four wards, fitted

up with bath-rooms and other necessary convenience, and capable of accommodating twenty sick women. The outhouses for both establishments consist of cook-house, and one large store divided into several rooms for medical and hospital stores.

Besides the ten barrack-rooms, there were three new ones being erected lower down to the west, but on the same ridge as the others. They are on quite a different principle; are built of stone, double-storied, and consist, as it were, of four distinct houses joined in one, each house having a separate angular roof, shingled with wood. In each flat, or storey, are four rooms, to contain twelve men each. Verandahs run round both flats; at the western corners of which, both above and below, small rooms are built for the sergeants. Each building, therefore, will contain exactly a hundred men. Cook-houses were to be erected on the east side of these buildings, and latrines low down on the side of the hill to the west. The lower verandah facing south and west in each building is inclosed to make a dining-room—a bad arrangement, for it excludes the air in a great measure from the lower rooms. The ventilation of all these three houses, especially on the lower flat, is very imperfect; the Engineer's Department, however, was prepared to make any alteration necessary.

During my observation here the prevailing winds were westerly, and the mean temperature about 70°. At the autumn season of the year the heat is considerable during the day; the mornings, evenings, and nights, however, are cool and comfortable. Frequent thunder-storms occur, but generally confined to the higher mountain ranges above the station. After the middle of April an unusual quantity of rain fell, but I have been unable to give the exact quantity, there being no pluviometer at the station.

The Regimental and Sudder Bazaars are, together forming one, situated below and to the north-east of the barracks, close to the main parade, on a small hill, separated from the main ridge by two deep gullies, which are generally dry, but in the wet season form two watercourses, one passing on the north and the other on the south side of the hill. The united bazaar consists of a number of mud huts, so arranged as to form several narrow streets.

The barrack-parade is about 500 yards square, and from it lead two roads, —one to Simla, and the other to the north-end of the station; and on the hill, above this latter road, are a number of private houses. On a little eminence to the south-west, overlooking the parade, is the school-house; and on the north-east, similarly placed with respect to the parade, is an old fort. The intermediate spaces all round are filled with private houses.

On arrival here, with exception of the hospital, I found the ventilation of all the barracks very imperfect, and that, unless doors and windows were left constantly open, the men would suffer, not only from the heat, but from living in a constantly contaminated atmosphere. I therefore addressed a letter to the commanding officer on the subject, requesting that immediate application might be made to have the ventilation improved, and recommending that air-holes, six inches square, might be opened at the bottom of the walls, all round each house, at a distance of three feet from each other. I also had to request that ventilators might be opened along the roof of the different compartments of every building, as I did not consider that those already alluded to in the top of the walls of the centre compartment were sufficient.

The cooking-houses were not good, being low and ill-ventilated; but that did not affect the men as native cooks were employed.

There was a sad want of ablution-rooms, there being only three for the whole barracks, and these so situated that the men occupying the southern buildings could not be expected to use them. I therefore recommended that the angles formed by the verandahs in each building be inclosed, and used as temporary wash-rooms. I also recommended that ablution-rooms be attached to each of the three new barracks.

The ablution-rooms that existed were of rather a complicated character, and could not be successful through a scarcity of water. They were fitted up with a row of metal basins, built into the masonry, over which was a large metal cistern intended to be constantly supplied with water from a reservoir on the top of the house.

From the cistern, it was intended that the water should be constantly flowing through the basins into pipes leading to an urinal attached to the wash-

house, and that by this means the urinal should be kept constantly flushed; the whole to pass into a stone tank outside, by a short stone drain, and be taken from thence daily by the meyhters.

The objections to this kind of ablution-room are:—1st. The supply of water that falls is uncertain, and that brought is too limited to keep up a constant flow through the basins, which consequently are liable to become dirty, and produce ophthalmia in those who use them. 2nd. When the supply of water is uncertain or limited, the urinal cannot be properly flushed, and becomes offensive. Such we found to be the case, and I was obliged to recommend that they be flushed twice a-day, and that water be brought for the express purpose. The floors in these three ablution-rooms are of stone, and I requested that wooden gratings might be put down for the men to stand on while they wash.

In this country, I think that ablution-houses and urinals should be distinct; and the following is what I recommended: viz., that to each barrack-room a small house be attached, and fitted up with either a stone shelf or wooden table all round, on which the men could place their own basins when they desire to wash; and, to insure a supply of water for this purpose, that a small open stone tank be built close to each barrack and ablution-house, in which might be kept water collected from the roofs by means of wooden pipes placed along the eaves of the houses; and, in the event of dry weather, water could be brought daily and put into these tanks, instead of as now customarily into dirty barrels and chatties. The men would thus have water always at hand for washing purposes.

The urinals should be near the privies, but distinct from them, and have stone troughs, which, when filled, the meyhters could empty and carry the urine away to a distance.

These recommendations were submitted for consideration.

The latrines or privies are ten in number, one for each barrack. The original intention was that the excreta should pass into a gutter of masonwork, sloping down towards a receptacle to which the urine was intended to flow; but time and want of proper attention caused most of them to get out of repair, so that the urine escaped and saturated the ground behind, causing in the evenings and mornings an offensive smell. It is highly necessary that they should be carefully cleaned twice a-day, and charcoal and lime liberally sprinkled in and around them.

There did not appear to be any regular system of drainage: the only made drain observed was one paved gutter, intended to carry surface water off the small parade in front of the south barracks. It passed between two of the buildings, and was arched over for about six feet of its course. It commenced at one of the cook-houses; and, as it was almost impossible to prevent the native cooks from emptying slops into it, the difficulty of keeping it clean and of preventing a disagreeable smell arising from it was almost impossible. There was another enclosed drain, in a very bad state of repair, on the large parade-ground, commencing at one of the surface-drains on the road on the south side of the parade, and opening into one of the watercourses of the bazaar. The sides of the portion of the hill on which the station is situated are intersected by a number of small watercourses, by means of which all rainwater is drained off, and carried into the valleys below.

The drainage in the bazaar, on our arrival, was very bad; in fact, everything about the place (the bazaar) was so dirty that I was under the necessity of bringing it to the notice of the commanding officer; and afterwards a great deal was done by the Assistant Civil Commissioner's orders. But a vast deal more must be done if it is wished to prevent disease amongst the native inhabitants. Drains have been made on both sides of every street; bheesties appointed to flush, and meyhters to sweep them. All the filth, however, collected in and swept from them is conveyed into the large lateral drains or gullies; and, though the appearance of the bazaar was thus improved, its sanitary condition was far from perfect. Something ought to be done to close the large lateral drains: they both commence on the hill where the north barrack stands, and in their course down to the bazaar are joined by many other little watercourses; so that the accumulated contents of all pass close beside the bazaar on the north side, and right through part of it on the south. These drains unite

on the east side of the bazaar in one large gully or watercourse, which runs down into the valley below on the east. In the dry season they are dirty and offensive, rendered worse by the irregularities in their course, where water and other things collect and become putrid; but in the wet season the rush of water keeps them tolerably clean. On the north side, a number of houses are situated close to one of these drains; and one house is positively built over it. The other, or south drain, runs under several houses. These things I pointed out to the Assistant Civil Commissioner, and recommended that the houses so situated should be thrown down, and that the drains themselves should either be properly built over or their course changed. I understood, however, that it would be necessary to compensate the natives if their houses were pulled down, as they had permission to build. To cover the drains would lead to great expense, and to change their course would be next to impossible.

There is an abundant supply of water about the station. That used by the men for cooking, drinking, and washing, is brought in puckallies on mules from springs and streams on the sides and at the foot of the hill, and emptied into chatties and barrels beside the respective barrack rooms.

On the parade, close to the bazaar, are a number of wells, and also some in the officers' compounds. They afford excellent drinking-water, the strata through which they filter being composed of lime and ironstone. A bathing-place was made at my recommendation, about two miles from the station, in the bed of one of the mountain streams, which numbers of the men used constantly.

From the same stream, higher up in its course, water might be brought by a channel cut in the sides of the hills right into the barracks and station. The distance in a straight line is about four miles, but a channel of nearly seven miles long would be required to lead the water to the barracks.

The expense of this might be considerable at first; but I should think that in a few years the amount saved in mule and cooly hire would repay the outlay; and, besides, the comfort and benefit derived by the men would be very great.

Good water for drinking and cooking would thus be assured them at all times, and bathing-tanks might be formed, and no excuse could then be offered for either local or personal filth.

Much might be done to improve the appearance of the station, by levelling, sloping, and smoothing irregularities, about the barracks and roads, and by planting grass and trees, which latter would not only afford shade but protection. The roads about the station, too, might be much improved, for many of them are neither comfortable nor safe to walk or ride on.

On arrival we had thirty meyhters, but afterwards authority was given for the employment of ten additional; these were all put under the charge of the pioneers, to see that they regularly, morning and evening, cleared about the barracks, cook-houses, ablution-rooms, privies, and urinals; removed all filth to a distance, and buried it; and sprinkled powdered charcoal and lime carefully on every spot that animal or vegetable substance, either solid or liquid, was removed from.

Twenty bheesties were employed, who received the water brought up on the mules and filled the water-barrels and chatties, and supplied water from them to the cooks, and to the men for drinking and purposes of ablution. Sixty mules were employed daily in bringing water for both hospital and barracks, and two for carrying rations.

The men were well fed, and the materials composing their diet good and properly proportioned. The bread occasionally was of inferior quality, but, by condemning it, the contractor was forced to supply better.

To improve the diet of the troops and afford a good supply of vegetables and fruit, a large garden at the foot of the hill, paid for by Government, was given over for the use of the regiment. It was under the superintendence of the surgeon, and I expected that by the next cold season vegetables of different kinds would be obtained in abundance. The expenses, I presumed, were to be paid partly out of the canteen fund, but chiefly from the sale of superabundant produce, and from the rent of some grass-fields attached to the garden.

A ration of liquor was allowed daily: it consisted either of two glasses of rum, or one pint of porter and one glass of rum. The porter was drawn in

quantity by each company, and served out by the orderly sergeant to individual men at dinner-time; the rum was drawn and drunk at the canteen by individual men who wanted it, after dinner and in the evening.

At the period of this Report, there were 167 men drawing two glasses of rum daily; 321 drawing a pint of porter and one glass of rum; 196 drawing porter only; 147 drawing one glass of rum only.

The morning drills during the wet weather were suspended at my recommendation, as I found that the men were suffering from the violent exercise before breakfast. The usual parades in barracks, or on private parades, were kept up, and also the usual weekly medical inspection.

A regimental school, under the superintendence of the chaplain, was open daily for three hours, the number of men attending being upwards of two hundred.

Quoits, cricket, and football constituted the amusements by day, and frequently theatricals took place in the evening; and it was in contemplation to erect a racket and fives court.

In the cold season I think that the troops might be advantageously and usefully employed in levelling and improving the appearance of the ground around their barracks.

The European burying-ground is at the north end of the station, and some distance from the barracks. The shambles are on the east side of the bazaar, quite away from the station. There were no public latrines, and those used by the men were at a proper distance from the respective barrack-rooms. The native burial-ground is on the east side of the bazaar, detached from the station; and the natives are compelled by "chuprussies" (appointed in the bazaar) to perform the offices of nature at a distance from their habitations.

Nets for containing charcoal, to hang up in all the privies, were applied for, and were to be furnished by the Barrack Department.

In the rainy season, Subathoo is by no means exempt from fever; but it is of a very mild remittent form, and yields easily to treatment. Bowel complaints, both diarrhœa and dysentery, are not so prevalent, and the exemption from these appears to be owing to the equable temperature, the alternations of heat and cold being neither great nor sudden. The peculiar form of bowel complaint known in the country as "hill diarrhœa," does not seem to prevail at all; at least, we had not any cases of it during the season. Rheumatic affections also are uncommon, and when they do occur are slight.

I have no means of drawing any comparison between this and the other hill stations; but, from what I hear, bowel complaints and rheumatic affections are more frequent and more intractable, when they do occur, at the latter than at Subathoo; indeed, we had several cases of the former sent here from other stations (Simla and Dugshai), and the patients rapidly derived benefit from our milder climate.

Ophthalmia, I understand from long residents in the station, is common amongst troops arriving at Subathoo from the plains; but the cases which appeared amongst us I believe were caused rather by want of proper ventilation in the barrack-rooms, and of proper ablution-rooms, than by any other cause. There is neither glare nor dust, for the whole country is covered with grass, and I did not see a case of ophthalmia amongst the natives. I am, therefore, not disposed to believe that it is an endemic disease, but that it is produced in the manner and from the causes I have mentioned.

I believe less rain falls at Subathoo—and there certainly is less fog, less damp, and less wind—than at the neighbouring higher stations; and the changes from heat to cold are not nearly so great or so frequent.

Recommendations offered by me, with regard to ridge ventilation, were sanctioned; but by a later order this very necessary improvement was put a stop to. I was in hopes, however, that before the return of the next hot season the prohibition might be revoked, and the work, already begun, finished. I represented that, so much having been done already, the expense of completion would not be very great.

A lithographic plan of the cantonment is attached.

The Barracks & Public Buildings are shewn thus
The New Barracks " " "
The Private Houses " " "
The Native Houses " " "

N°. 50 (near large Hospital) is the Female Hospital

Shambles
Old Native Lines
Old Barracks
Bazar
Fort
POND
PARADE
European Grave Yard
New Barracks
Church
Hospital
Garden

TOPOGRAPHICAL AND SANITARY REPORT ON THE STATION OF MEEAN MEER.

By Dr. T. G. Scot, 79th Highlanders.

Meean Meer, 1st March, 1860.

The cantonment of Meean Meer, in lat. 30° 34′ north, long. 74° 4′ east, is situated on an extensive plain, six miles to the east of Lahore.

Meean Meer is computed to be 1,500 feet above the sea-level, and is slightly higher than the city of Lahore. On this account, I believe, it was selected by Sir C. Napier as an eligible site for European barracks. The area within cantonment boundaries is 13 square miles.

The soil varies from a stiff clay, or loam, to a very light grey sand, beneath which is a bed of kănkăr, resting on silicious sand. There is a good deal of nitre in the soil. The alluvial deposit is of no great depth, and is decidedly sterile, but, with the aid of manure, is susceptible of considerable improvement. Water is abundant, but only obtainable by sinking deep wells: in some localities the water is slightly brackish, but in the majority of wells it is pure and wholesome.

The magnificent new canal, the central line of which is 247 miles in length, with three branches, amounting to 219 miles more, and which traverses the length of the "Bărī Doăb," is now nearly completed: it passes within a mile of the northern end of the cantonment.

In the Punjab the climate is superior to that of Lower Bengal or the North-west Provinces. In May, June, and July the heat is intense, but this is in a great measure counterbalanced by the uniform dryness of the atmosphere, and the small amount of rain. No "periodical rains" occur in this district, which seems to lie just beyond the limits of the monsoon.

In winter the weather is cold: the temperature sometimes falls to within a degree or two of the freezing point. The cold season commences about the end of October. November, December, and January are delightful months, and even so late as the end of March the mornings and evenings continue to be pleasantly cool.

The climate is decidedly favourable to the maintenance of health, and the temperature is materially modified by the proximity of the Himalaya mountains, from the gorges of which powerful currents of cool air sweep over the plains, raising terrific dust storms, which, though disagreeable at the time, have the effect of purifying the atmosphere and lowering the temperature.

From want of a thermometer in the hospital I have not been able to keep a register of the temperature; but I find it recorded that the average temperature in 1857 was 73° 4′, the maximum 101°, the minimum 41°.

The diseases common to the Punjab are fevers, liver complaints, and dysentery.

Few trees ornament the station, but almost all the waste ground is covered with stunted, thorny shrubs and plants which thrive in an arid soil.

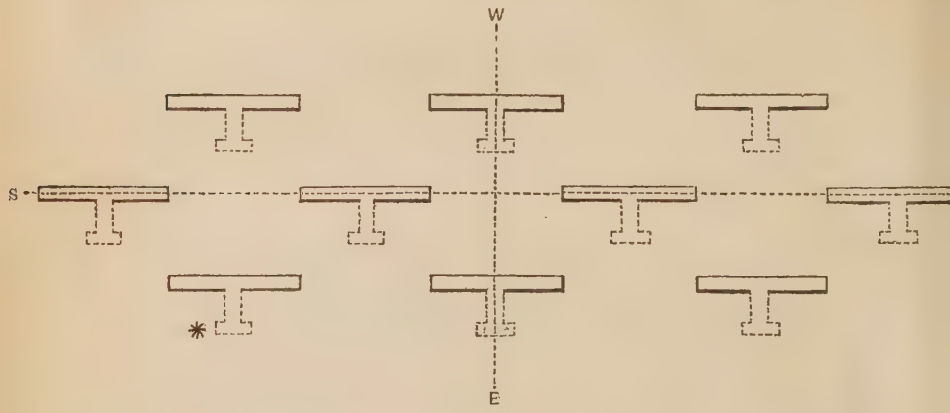
To obviate the necessity of entering into a long-written description of the station, the construction, dimensions, &c., of the barracks and attached buildings, I have had a few copies of plans* executed, which, I trust, will give all the information sought for on this point.

As the barracks for European troops are all built on a uniform plan, a description of one will suffice.

The following plan is that of one of the "European infantry lines." There

* Unfortunately the set of Plans did not reach this Department.

are in all 10 distinct buildings on this plan, occupying a superficial space of 862,500 yards, and arranged thus :—



Thus no barrack intercepts the free circulation of the air. There is a space of 150 paces between each two rows, and consequently 300 between the front and rear rows. Attached to the rear of each, and connected by a covered way, is the bath and ablution room, and urinary, with its cesspool. In the intermediate spaces, and at a sufficient distance, are the cook-houses and cesspool-privies. The barrack is built of pākkā brick, and has a tiled roof. In the dormitory there are 20 skylights, which can be opened and shut by means of a check string. The greater number of the buildings are paved with square or hexagonal tiles, but a few with narrow bricks, which have become worn and loosened, so that the flooring is in a very bad state.

A short description of the bath-rooms, with urinaries, as well as of the cesspool privies, with a note of the improvements and alterations which have been frequently and urgently brought to the notice of the executive authorities, is requisite, as the defects in the present arrangements are manifestly contrary to the established sanitary principles of the age.

Each ablution-room is supplied with water from a well adjacent to the barrack. The water is raised by a Persian wheel, and introduced into the building by a metal pipe. On one side of the room is an oblong pukka foot-bath ; on the other side a row of copper hand-basins, let into a breastwork of masonry attached to the wall. A pipe introduced into the wall supplies each basin with water through a spring stop-cock. All the overflow and foul water passes by a pipe into the urinal, which is of stone-work and pukka, and attached to the reverse side of the wall to that on which the basins are. The object of this arrangement is to ensure an almost constant flow of water to flush the urinal. The urine, diluted by this waste water, is carried off by a covered drain into a cesspool close by.

The whole is defective, and the following new arrangement has been submitted to the Executive Engineer for approval.

The foot-bath to be done away with, and one or two tubs substituted, with a couple of cocks placed at a suitable height, from which to draw water. The basins to be removed from the wall, and a double row erected in the centre of the room. Wooden gratings for the men to stand on to be placed upon the floor. All communication with the urinary to be cut off. The waste water to be carried off to some little distance, and collected in a circular pukka tank or tanks, and used for sprinkling on the ground to lay the dust ; any overflow to be carried into the main drains. The urinals to be abolished, and the cesspools filled up. In lieu of the former, eight or ten earthenware pans to be placed in the urinary, resting on supports of iron, at a height varying from 26

* Bath-room, with covered way.

to 30 inches, the contents of which are to be emptied by the sweepers into casks, which must be carted or carried away *several* times a day.

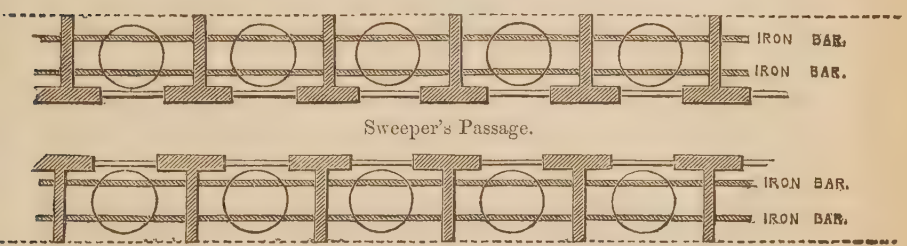
The following description may be given of one of the cesspool-privies. Over the mouth of a deep, large cesspool is a circular platform, pierced by openings, in which are metal pans, with traps worked by a handle, the whole cased in wood. In the centre of all is a large funnel, the lower end of which is built into the mouth of the pool; the upper passes out through the roof of the privy, intended as an escape-pipe for the foul gases generated in the cesspool.

I need not dwell on the defects and evils of this system, as cesspools have already been condemned by Government; but I beg to suggest for adoption the following plan in lieu of cesspools:—

1st. The cesspool to be closed by solid masonry, having previously deodorised the contents by the introduction of lime, wood ashes, charcoal, and earth.

2nd. To have the wooden structure and pans removed, and a privy constructed on the model shown underneath, only, instead of pukka brick, I recommend a flooring of well-rammed clay, at least two feet in thickness, on which a layer of dry sand, to the depth of four inches, should be spread. The divisions should be made of sun-dried brick, slate, or stone, without *lime* or *whitewash*, but covered with a plaster made of common "chikkuree muttee," or potter's clay, which looks clean, and can be removed as often as required. No wood-work should be allowed, but flat iron bars to sit upon, thus—

Front.



Front.

To have large-sized glazed pans underneath, placed on the sand, which are to be removed by the sweepers by the passage between the two rows, as shown in the above plan.

The glazed pans to be of such a size, and so placed, as to receive all urine as well as ordure.

All refuse to be removed four times a day; the pans to be carefully scrubbed and cleaned out with water and wood-ashes before being replaced. Wood-ashes from the cook-houses, and the refuse dust of charcoal, will be found to answer this purpose admirably, and ought to be kept ready mixed, and stored close to the privy.

The points most essential for the conservancy of privies and urinaries, and which have been approved of and tested in practice at the Lahore Central Jail, are—

1st. The absence of all masonry and pukka work, containing *lime* or *cement*.

2nd. The prohibition of all drains, pipes, or conduits, whether closed or open, leading either in or out of the privies or urinaries.

3rd. The prohibition of water being used to flush the ground or flooring, all of which must be kept perfectly dry.

4th. The urinary and privy to be under one roof.

5th. No lime to be used, as the uric acid has a strong affinity for lime, and the compound formed by the reaction of the acid on the lime is that which produces the overpowering ammoniacal fœtor so much complained of. Slabs of stone or tiles, as they require to be joined by cement of some kind, are quite as objectionable as pukka-work. All metal tubes, tile drains, &c., are bad.

6th. No cesspools.

Enamelled iron pans are liable to be broken by a fall; the enamel cracks, and the vessel becomes useless. Copper pans are likely to be stolen. Glazed pans of any size can be made at Mooltan or Peshawur, and are the most suitable for the purpose.

The cook-houses are good, and I have no suggestions to make with regard to them.

The quarter-guard of the barracks is used as a brigade guard, and for this purpose is too small. There are no proper lock-ups attached to it, and the ventilation is deficient, there being no opening in the roof. This important want has been brought to the notice of the Executive Engineer, and is, I understand, to be rectified.

There are no cells in the cantonments. Regimental prisoners are kept in solitary confinement in a suite of the rooms intended for non-commissioned officers, at the end of one of the barracks. In a sanitary point of view they are unobjectionable.

Hospital.

There are two hospitals for European troops in the station—one attached to the European Infantry lines, the other to the Artillery and Cavalry. The former is at the north-west, and the latter at the south-east corner of the station.

The European Infantry hospital, covering a space of 60,000 superficial yards, is built for the accommodation of the sick of one regiment.

The privies are constructed pretty nearly on the dry principle, and, were the wood-work and the stone urinals removed, and the plan I have suggested for the barrack privies substituted, they would be perfect.

Charcoal, in net bags, is suspended in the wards and in the privies to act as a deodorant, and I think it is very beneficial.

The only other point to be noticed is the drainage of the station.

The east main drain has a fall of two-and-a-half feet per mile, the southern drain four feet per mile, and the subsidiary drains, which are numerous, have a fall of three feet per mile.

On the whole, I consider the drainage very good; but in the Artillery lines it is somewhat defective from want of a good pukka main drain, with its proportion of feeders. The great east drain might with advantage be carried farther south, so as to drain more effectually the Artillery and Cavalry lines.

The drains and roads are under the superintendence of the Executive Engineer, who can expend 200 rupees per month in keeping the former clear and the latter in repair. There are 14 miles of pukka, and 17 miles of kutcha roadway in the cantonments. Very little can be done in the way of watering the roads for want of funds. During the months of August, September, and October the annoyance from the dust on the roads was so great that, as Sanitary Officer, I brought it to the notice of the Brigadier Commanding.

The bazaars, being a distinct district, as it were, I have not taken notice of them in conjunction with the description of the station generally.

There are two sudder bazaars. They are quite away from any quarter occupied by Europeans, and are built in the form of a square, the streets, which are of great width, being at right angles to the main central one. The jurisdiction over the sudder bazaar is in the hands of the cantonment joint magistrate.

Attached to the European Infantry sudder bazaar is a rum distillery, which, as Sanitary Officer, I had to report upon as follows:—

"Sir,—As Sanitary Officer, I have the honour to direct your attention to the state of the drain and ditch intended to convey away the refuse liquor from the rum distillery in the sudder bazaar. The drain (a pukka one), after it passes the confines of the bazaar, discharges its contents into a shallow ditch, which is kept in such bad order that the sewerage is allowed to overflow and make channels in various directions, thus distributing the fluid over a large space. The effluvium arising from this distillery is too plainly perceptible all over the cantonment, more particularly at

night, when the wind is easterly or northerly. The nuisance may be lessened by insisting on the proprietor having the drain flushed by a continuous stream of water, by employing people to protect the drain from being broken down by cattle, and, lastly, by the free use of chloride of lime as a deodorising agent.

"In laying before you the foregoing suggestions, I am aware that they are merely palliative. The proprietor has commenced sinking a pit, as a receptacle for the refuse liquor—in my opinion a measure not calculated to meet the emergency, as I consider the removal of the distillery to be the only thoroughly effectual measure.

"I have the honour to be, Sir,

Your most obedient servant,

To the Officer Commanding at Lahore. (Signed) T. G. SCOT, M.D.

Strict attention is paid to the conservancy arrangements of the entire station. The mode in which they are carried out will be best understood by a perusal of the Brigade Orders on the subject, copies of which are annexed.

The conservancy of barracks and hospitals is carried on under the supervision of the respective quartermasters.

One *paid* dust-cart, and one cart with a cask, for the removal of fluids, are allowed for the barracks of one regiment, and one of each for the hospitals of both regiments. At one time two were allowed, but one was withdrawn on account of the great expense to Government. A very short trial with the reduced establishment proved that it was absolutely necessary to entertain an extra cart with a cask, in order to get rid of the foul and waste water from the cook-houses.

Since writing the foregoing detail of sanitary arrangements and improvements proposed, a special committee have sent in a Report, recommending the immediate adoption for European barracks of sanitary arrangements similar to those in use in the Central Jail, Lahore; and I understand that the Executive Engineer has received instructions to do away with the cesspools attached to privies and urinaries, and to alter a privy belonging to each regiment to the dry principle plan as an experiment. I have delayed sending in this Report, in hopes of being able to add that the altering of every privy and urinary was authorised and actually being carried out, as the shutting-up of cesspools and the disuse of water in urinaries cannot now be looked upon as an experiment. We have the satisfaction of knowing, however, that the dry system is now recognised as the only one adapted for efficient conservancy.

SANATORIUM, CITTA VECCHIA, MALTA.

Report for the year 1861.

By Surgeon-Major T. P. Matthew.

The Sanatorium is situated about six and a-half miles from Valetta, and within the fortifications of that part of Citta Vecchia called Notabile. It was opened as an hospital in June 1860.

The establishment consists of a large, irregular building, formerly a palace of the Grand Masters, and is stated to be 640 feet above the sea level (engineers' measurement); in other words, on almost the highest elevation of the island.

The large, crowded, and dirty town of Rabbato is entirely cut off from Notabile by the ancient fortifications of the latter, including a deep and wide ditch, and a carefully preserved glacis. Rabbato is also on a lower level, and only by its outskirts approaches Notabile on the south side. Notabile itself is very sparsely inhabited, being principally made up of the cathedral, several churches and conventual buildings, and houses of the better class, which last are for the most part untenanted.

The general configuration of the surface of the country slopes downwards from Notabile for some distance. On the south and west the land soon again rises, so that the Verdala, his Excellency the Governor's summer residence, about two miles distant, in a direction somewhat to the eastward of south, is

slightly more elevated than the Sanatorium, and the absolute highest point of the island lies to the south-west, about four miles distant. Neither of these points, however, are more than a few feet above the site of Notabile. Towards the north and east the ground falls at once, by a precipitous break in the tertiary limestone rock of which Malta is composed, some fifty or sixty feet, and afterwards descends by gentle slopes towards Valetta to the level of the sea.

Thus situated, and with this general configuration of the surface of the country, it is clear that the general aeration of the site is more favourable than can be usually obtained. Upon three points of the compass, the aspect is perfectly open to the country: on the west and south-west this is the almost bare limestone rock. The country north and east presents clay beds; but they are at such a very much lower level, that they can, I apprehend, in no way influence the sanitary condition of the place, and the general lie of the surface towards Valetta, in which direction the natural drainage tends, is such as effectually to prevent any lodgments of surface waters. The only point, then, whence we might expect deleterious influence is from due south, but Rabbato seems too far removed, and too completely shut off by several large and high conventual buildings, which face the aspect of that town towards Notabile, as well as by the clear and wide space of the glacis and ditch, to have any appreciable influence on the sanitary condition of this hospital, the more so as Rabbato is at a lower level than Notabile, and the wind very rarely indeed sets from the south.

The natural drainage of Rabbato is good, and flows wide to the east and west of Notabile; but I am unable to report upon the state of its artificial drainage—probably it is of a very imperfect nature. The natural drainage fall of Notabile could scarcely be better; but the artificial, or house drainage, is almost nil, and, where it exists, probably it is chiefly into cesspits, as is the custom throughout the island. The very small population, however, of Notabile, and the natural advantages of the spot, must go far to neutralise any evil which might, perhaps, otherwise arise from this source. The drainage of the hospital itself, I believe to be very good. A covered drain is led through an old sally-port passage into and beyond the ditch, some distance down the hill slope, where it terminates in a tank. This is emptied periodically by contract (the contents being considered valuable as manure), and during the summer months I found it expedient to require this service to be performed once a fortnight.

During the summer, at which time the establishment may be considered to be of more utility than during the cool season of the year, probably no better site for a sanatorium could be found in the island (if indeed so good), and it has the advantage (besides the previous existence of a suitable building in possession of Government), of being about the nearest point to Valetta at which the heights of the Bengemmi hills are reached, also of a good road the whole way, and the precipitous elevation of the site, and the main aspect of the building, prevent in very great measure the evil effects of the surface sun-reflection usually so much complained of in Malta. During the winter months, however, I am of opinion that the situation may be almost characterised as bleak, being much exposed to the high winds which are then apt to prevail, and consequently during this period of the year (short, however, in Malta), I conceive that cases, more especially of lung affections, should be sent here with great caution.

The main aspect of the building is nearly east, and it looks out on to the open country in the direction of Valetta, and forms part of the main wall of the old fortifications, which have a sheer fall at this spot of between 40 and 50 feet.

The building itself is of stone, and mainly arranged round a central quadrangular court, although there are two small subordinate courts. This mode of building, common, nay almost universal along both shores of the Mediterranean, and certainly as old as the time of the Romans, seems to have been adopted with the twofold object of excluding the sun, and at the same time encouraging ventilation.

The lowest story is entirely taken up with stores, kitchens, bath room, ablution room, dead room, &c., &c., and also comprises a large dining hall for convalescent patients, which is, besides, used as a chapel.

A very elaborate description of the building having been forwarded last year, I shall pass over all the offices on the ground floor, simply contenting myself with stating that they afford ample accommodation for the purposes indicated.

The wards in occupation by patients are all on the second or (where such exists) third story. The greater part of them are spacious and lofty, and leave little to be desired in this respect. All the floors are throughout of stone, as is almost always the case in Malta. To meet the objection of exposing a patient's naked feet to the stones on first getting out of bed, each is furnished with a smooth deal plank, which is placed alongside the cot.

The following tabular statement shows the number and appropriation of the several wards, with the estimated clear cubic space per bed, but *without calculating space to a greater height than twelve feet* from the floor, and without reckoning the embayments of the windows and other recesses and offsets, where such exist. Wards 1 to 10 inclusive, however, are in fact 30 feet high, or thereabouts. Ward 12 is about 15 feet, and the wards situated on the third story, viz. Nos. 13 to 18 inclusive, are 12 feet 2 inches, up to the beams of the roof.

No. of Ward.	No. of Doors.	No. of Windows.	Length in Feet.	Breadth in Feet.	Height in Feet.	Cubic space in Feet.	No. of Beds.	Cubic allowance per Bed.	Whether supplied with Warming Apparatus.
No. 1	1	3	25·	21·	30	6,300	4	1,575	None.
2	3	3	36·4	24·5	30	10,640	8	1,330	Gurney's stove.
3	2	2	28·2	20	30	6,760	4	1,690	None.
4	2	2	23·	22·8	30	6,280	5	1,256	,,
5	3	1	33·	18·2	30	7,194	5	1,440	,,
6	6	2	55·	27·2	30	17,928	14	1,280	Gurney's stove.
7	4	1	27·	26·6	30	8,586	7	1,226	Open fireplace.
8	3	1	25·2	22·	30	6,644	5	1,330	,,
9	4	4	36·	19·6	30	8,424	6	1,400	Nettleton's stove.
10	2	3	31·	15·2	30	5,642	4	1,410	None.
11*									
12	1	2	27·	15·	15	4,860	4	1,215	,,
13	3	2	17·4	14·2	12·2	3,016	3	1,005	,,
14	3	2	21·6	14·5	12·2	3,732	2	1,862	,,
15	3	1	24·	12·6	12·2	3,600	2	1,800	,,
16	3	2	31·	14·8	12·2	5,456	3	1,818	,,
17	3	4	52·	19·7	12·2	12,168	8	1,520	,,
18	1	2	24·6	12·	12·2	3,528	2	1,760	,,

Total Number of Beds, 86: Average Cubic Space, 1,460 feet.

It usually happens that, where there is more than one door in a ward, the supplemental doors open into other wards; but in every ward, without exception, there is a door opening into the external corridors. This arrangement affords in the summer months the means of very freest ventilation throughout the building, although defective in some respects.

It thus appears that the cubic space allotted is most ample and unusually large, while the means of ventilation during the warm months is also almost as perfect as if the building had been specially designed for an hospital. Many and somewhat important improvements, however, in the original state of the building, were added at the suggestion of the last Inspector-General of Hospitals, before its conversion into a sanatorium; but a few minor improvements in this direction remain to be completed.

The warming of the building (supposing it to be fully occupied during the winter months, which I imagine will rarely be the case) I think should be

* Converted into a Reading-room.

improved. It will be seen on reference to the Table, that only five of the wards are provided with the means of effecting this. By a careful apportionment of patients, however, it is hoped no disadvantage in this regard has hitherto accrued, although it has necessitated to some extent the mixing of various kinds of maladies (more especially eye affections) with others, which, in some instances, the military authorities have thought objectionable, although his Excellency the General Commanding has expressed his full concurrence with and approbation of the proceedings of the medical officers in this respect.

Wards 4, 5, 6, 7, and 8 open on to a cheerful and wide terrace, with a look-out towards Valetta, one of the finest views in Malta. It has been proposed to place a light wooden verandah over this terrace, which will have a double advantage, first in screening the before-named wards (the best in the establishment, accommodating between them thirty-six patients) from the morning sun; and, secondly, it will also allow the terrace to become a sort of open-air day-room for the summer.

Free access to one of the angle bastions of the fortifications, which comprises a considerable plot of ground, is also open to the patients. In this spot, but in this only, smoking is allowed, under regulations specially sanctioned by his Excellency the Lieutenant-General Commanding.

The water-closets of the establishment are as follows:—

1. At one end of the terrace above mentioned, and in the open air, is one which comprises three seats; these it is necessary at present to flush by hand, which is carefully done by the two Maltese labourers attached to the establishment for this and other cleansing purposes. At this spot also are located several urinals. Both these last and the waterclosets, I conceive, are nearer to Ward No. 4 (which opens on to the terrace by galvanized windows in the closest proximity) than should be for the comfort of the patients inhabiting that ward, although I do not think, with an efficiently carried out system of flushing, they can prove injurious to health.

2. Opening out of Wards 8 and 9 there is a small wash-room, and from it open a set of water-closets having five seats, which flush from the tank on the roof of the building.

3. A water-closet with two seats looks on to one of the secondary courts, and flushes from above.

4. And one with one seat is attached to the Ward Master's quarters, which also flushes from above.

These four are all situated on the middle, or main story, of the building.

5. On the upper story there is only one (comprising two seats) which flushes.

6. On the ground floor there are two, comprising three seats, which require to be flushed by hand.

It is thus seen that all the water-closets (except that opening on to the secondary court) are somewhat objectionably placed. The first named cannot be reached without opening one of the doors which lead to the open aspect of the building, of one or other of wards from Nos. 4 to 8. The second can only be arrived at by passing through either Ward 8 or 9. The fourth is reserved for non-commissioned officers and their wives. The fifth can only be reached by passing through Ward No. 13, which occasionally is required as a prison ward, and when thus employed there are no water-closets available on the upper floor. The two on the ground floor are too far removed to be generally available for the patients. The objection against opening ward doors having an outside aspect, at night, during the high winds which frequently prevail here during the winter months, must be personally felt to be fully appreciated. The proceeding is likely to be injurious both to the man seeking an outlet through a ward, and also to any weakly patient occupying a bed in the ward. I conceive that suitable additional accommodation might be easily provided within the shelter of the walls of the courts, which could be reached without the necessity of passing through a ward.

All the latrines have been kept daily flushed and cleansed, and quicklime applied.

Off Ward No. 2 there is a small room told off as an orderlies' room, with two beds, which, on exigency, might be made available for patients. This might

be the more easily effected, as we have seldom had our full complement of orderlies attending on the sick (at the regulation rate of one to ten), on the plea that the Army Hospital Corps has been short handed; and, as many of the patients were convalescent, a larger number of orderlies was not considered necessary, and could not be allowed. I am of opinion that the orderlies should sleep in the ward, whenever a sufficient number are not allowed to permit an arrangement being made whereby every ward shall at all times have an orderly in or about it, in case his services should be suddenly wanted by one of the sick.

The Water Supply is obtained from a large tank which occupies the entire of the main central quadrangular court, the water being collected from the roof of the building. The greatest care is exercised to keep the roofs clean, and patients are not allowed access to them. The quality of the water is consequently good, and no filtration or other process is necessary to fit it for use. In case of an additional supply being needed, a communication exists with one of the sources of the main aqueduct which supplies Valetta with water, from which an almost illimitable supply is obtainable by means of a force-pump, and from this source a large iron tank on the roof of the building (from which the various water-closets are flushed) is filled.

Food.—The supplies furnished by the purveyor's contractor have generally been of good quality, and not open to serious objection. The bread, however, which I conceive in an hospital should be of first-rate quality, has sometimes been very indifferent, being ill-baked, and apparently made from second or third rate flour, leavened, and not yeast made, as I have been given to understand the contract provides it should be. After a troublesome correspondence, entailing a reference to the General Commanding, this has in a measure been rectified. Potatoes could not be supplied during nearly the whole of December, and were only issued some four or five times during that month, on account of the old crop having become so much deteriorated as to render them unfit for issue, and the new crop not being sufficiently advanced to be available. During the above-named period bread was issued as a substitute. How far, however, it may be advisable to limit the patients to potatoes solely as vegetable food, I think questionable, seeing that the island affords abundance of cauliflower, cabbages, pumpkins, and many other vegetables, at *very* low prices. I think that a modicum of the cruciferous vegetables, at all events, might with great advantage be occasionally added to the food of the convalescent, not only in this, but also in the regimental hospital. Indeed, in some instances I have felt myself fully justified in ordering lemons, on account of what has appeared to me to be a scorbutic tendency on the part of patients admitted under treatment.

Cooking.—This has been efficiently, and, on the whole, well performed; but the cooking of small delicacies for patients very ill has been, and I suppose always will be in a large hospital, indifferently performed. If the female nurses are ever to become an established institution of the service, it seems to me that this hospital is one where the superintendance of a *suitable* female nurse is specially likely to prove beneficial, especially in the particular just adverted to.

Clothing.—This has been the regulated hospital clothing for the Command—suitable and convenient enough. The supply of clean clothes, wanted on an emergency, has sometimes been scanty, owing, I believe, mainly to a delay in transmitting the washed clothes from Valetta. This, however, has been represented, and I hope rectified for the future.

Bedding.—The supply has been good and ample. The bedsteads, however, which have been in use have not been regulation hospital bedsteads, but cots, with iron-barred bottoms, on which the mattress rested. This, in cases of patients whose diseases have presented profuse diaphoresis, has had a twofold evil result—the under surface of the mattress gets saturated with moisture, if it is turned, the patient very properly complains that the new surface is damp, or even wet; if it be left unturned, the iron bars in a very short time destroy the ticking, and a re-making of the mattress and a new ticking become necessary; and unless a sufficient number of beds are disposable to allow of one patient occupying (in such cases) two beds, shifting from one to the other, the very greatest care cannot prevent, in frequent instances, one or other of these results.

These objectionable cots are now, however, in course of being changed for sacking-bottomed bedsteads.

Cleansing of Premises.—Two Maltese labourers are attached to the hospital, under the Purveyor's Department, for the purpose of performing this service throughout the building (excepting only the interior of the several wards, for which the orderlies attached to the Medical Department are responsible), and the duty has been efficiently performed.

Intemperance.—There is great difficulty in preventing this vice among the patients. I have been compelled to require wire netting to be placed over several windows, although a story above the ground, to prevent liquor being hoisted in through them; and also to apply to his Excellency the Lieutenant-General Commanding to forbid the men, while in this hospital, being furnished with money. These measures seem to have had a good effect.

Meteorological Instruments.—Forms and tables have not been supplied. A register of thermometrical observations, which may be accepted as the usual *inside* temperature of most of the wards, has been furnished to the Principal Medical Officer weekly. It has been kept in the surgery, which is on the same story, and under similar conditions to those existing in most of the wards not furnished with a special warming apparatus. The wards on the upper story must, however, be excepted, which are probably hotter in summer and colder in winter than the temperature shown in the register.

A wet and dry bulb thermometer has been supplied, but as it has only been in use for the last two months, I think it unnecessary to attempt to draw any deductions from the instrument.

A record of the observations of an aneroid barometer has also been forwarded; but as I do not consider the instrument trustworthy, without a mercurial instrument with which to compare its readings, I attach no importance to the document in question.

It seems to me, however, that it is worth while to attempt to ascertain the actual atmospheric differences between those of this post and those of the town of Valetta, where accurate observations are understood to be kept by the Engineer Department.* I would beg to suggest that, if this establishment is intended to be carried on, it is expedient that a *complete* set of meteorological instruments (including all the latest improvements) should be supplied.

No registering thermometer has been procurable, but the lowest temperature observed during the year (in open air, with north aspect) was, dry bulb, 44·5°; wet bulb, 38·°, on Christmas-day.

The highest in the open air I have no means of ascertaining, but the highest inside temperature observed was 86°, in August; the lowest inside temperature observed, 52°, on the 31st of January, and again on 27th December. These temperatures appear to be neither too high for perfect health, and at the same time quite low enough to establish a thoroughly tonic influence on frames enervated by the last summer heats.

The following Table shows the cases admitted into the Sanatorium during the year :—

* A duty since transferred to the Medical Department.

Order.	Diseases.	Remained under Treatment at close of last Year.	Admitted during the Year 1861.	Total under Treatment.	Discharged to Duty.	Discharged recommended to be sent to England.	Discharged for further Treatment in Regimental Hospital.	Died.	Remain.
	Class I.								
	Ophthalmia	21	88	109	69	5	5	..	30
	Boil	..	1	1	1	..	..	..	..
	Dysentery	..	7	7	5	..	..	..	2
1	Diarrhœa	..	3	3	3	..	..	..	..
	Cholera Sporad. ..	..	1	1	1	..	..	..	..
	Fevers	9	92	101	74	..	..	..	27
	Sequence of Fever ..	2	19	21	18	..	..	..	3
	Rheumatism	..	12	12	7	..	..	..	5
	Strict. Urethræ ..	1	..	1	1	..	..	..	..
2	Bubo Syphil... ..	..	2	2	2	..	..	..	..
	Syphilis Sec.	1	8	9	7	2	..	..	..
	Sarcocele Syph. ..	1	2	3	2	..	..	..	1
	Class II.								
	Scrofula	1	4	5	4	..	..	..	1
1	Morbus Coxæ ..	1	..	1	..	..	1	..	..
	Phthisis	1	9	10	3	5	2	..	..
	Class III.								
	Neuralgia	..	..	..	..	..	..	..	..
1	Amaurosis	1	..	1	..	..	1	..	..
	Otitis	..	2	2	1	..	..	..	1
2	Hypertroph. Cordis ..	..	1	1	..	1	..	..	..
	Aneurism Aort. Abd.	1	..	1	..	..	..	1	..
3	Bronchitis	..	6	6	5	1	..	..	..
	Asthma	..	1	1	..	..	..	..	1
	Dyspepsia	..	4	4	3	..	..	..	1
4	Fistula in Ano ..	..	1	1	..	1	..	..	..
	Splenitis	..	1	1	..	1	..	..	..
	Hepatitis	..	3	3	..	1	..	..	2
5	Nephria	..	1	1	..	1	..	..	..
	Pemphigus	..	1	1	1	..	..	..	..
8	Ulcus Cruris	..	1	1	1	..	..	..	..
	Bubo non Syph. ..	..	1	1	1	..	..	..	..
	Class V.								
1	Contusio Genu. ..	..	1	1	1	..	..	..	..
	Contusio Perinæi ..	..	1	1	..	1	..	..	..
	Diseases of Uncertain Nature	1	6	7	..	4	1	..	2
	Total ..	41	279	320	210	23	10	1	76

On examining this Table it will, I think, be evident that the diseases arrange themselves naturally into nine classes—viz., 1, Ophthalmias; 2, Zymotic Bowel Affections; 3, Fevers and their Sequelæ; 4, Rheumatisms; 5, Syphilis; 6, Tubercular Diseases; 7, Chest Affections not Tubercular; 8, Other cases, not included above, of a hopeless nature as to cure (at all events, in a sanatorium intended to render *soldiers* efficient), and among these must be classed "Diseases of uncertain nature," or, in other words, with respect to the majority of instances, "not yet fully diagnosed," and, in some instances, scarcely possible of *certain* diagnosis until termination in death and post-mortem examination; 9, A few other diseases of comparatively trivial nature.

I now offer some remarks as to the working of the establishment, as to its utility, proved or problematical, as to what I conceive to be its short-comings, and as to its improvement for the future.

With respect, then, to the proved efficiency of the establishment for the treatment of the various affections above classed, I beg to be allowed to report as follows, the results of the best observations I have been able to give to the cases sent here during the past year.

1. *Ophthalmia.*—The free aeration of the place, and the tonic influence derivable therefrom, would seem to point out this as an eligible spot for conducting the treatment of such cases as prove at all tedious in the various regimental hospitals, and the return does not seem to contradict that opinion. The powerfully-curative influence, however, exerted by sea-bathing, and possibly even the effect of the local application of sea-water as a collyrium, in very many chronic cases of this affection, seem to me to point out that a residence here should not be too protracted; but that if a manifest advantage is not derived after a residence, say of three months, such cases should be transferred to an establishment where the advantages indicated above could be obtained. Such a one presents itself in Forrest Hospital, supposing always that building not to be required for other purposes. Moreover, the high winds which often prevail here have seemed to me to have exercised a prejudicial influence in many cases of these affections, from which objection, to a certain extent, I apprehend that establishment is exempt.

2. *Zymotic Bowel Affections.*—The numbers under treatment are too few to allow me to speak very certainly on this point, but I apprehend this spot would be found eminently calculated for the successful treatment of any which might present themselves in this Command, although at the same time my own opinion is, that it will probably be found, as the result of a larger experience, that chronic cases of these affections are, as a rule, treated most advantageously, both with respect to the public service and to the individual patient, by a comparatively early removal to England.

3. *Fevers and their Sequelæ.*—The Table, and the examination of the results of cases treated, point out, I think, very emphatically that the Sanatorium is specially adapted for the recovery of patients suffering from these affections; indeed, the rapid progress towards perfect convalescence observable in such patients has at times been such as almost to astonish me; but, at the same time, where serious chest complications exist, as before indicated, I think caution should be exercised in recommending their transfer to this place during the winter months.

4. *Rheumatisms.*—Change of air is well known often to have a powerfully-curative influence in this disease, and such has seemed to be the case in regard to a removal to the Sanatorium. In cases of pure rheumatism, however, I do not think any *other* special good effect has been produced by a residence here.

5. *Syphilitic Affections.*—The general tonic effect of a removal to the pure air of the Sanatorium has appeared materially to aid the curative effect of remedial measures in the comparatively few numbers of these affections presented on the Table.

6. *Tubercular Diseases.*—As a rule, I do not think cases of pulmonary tuberculosis, when at all advanced, receive much advantage from a removal to this place, even during the summer months. The winds are often keen, and, although the number of instances from which I draw this deduction is small, I feel pretty sure it is correct. It accords, moreover, with the results of the observation of the native practitioners. Where, however, cases are in the incipient stage, I think that *during the hot season* considerable benefit may be derived in many instances, if not in all.

Cases of diseases of scrofulous nature not pulmonary appear, as far as the small numbers treated will enable us to judge, to do remarkably well.

7. *Chest Affections not Tubercular.*—These, I think, should be sent here with the utmost caution, unless during the very height of the summer, and even then the risk in removal appears to me to more than counterbalance any good derivable from a residence here, unless after convalescence is pretty surely established.

8. *Cases hopeless of Cure as Soldiers* (comprising, as before stated, most of those returned in the Table as "uncertain diseases") must be looked at, having due regard to the specialties of each individual case. Many, if carefully selected,

may receive benefit, and some doubtless have done so; but, unless adverse cases are carefully excluded from them, no statistical tables can by possibility afford the remotest clue to the value, or otherwise, of the establishment. I think the foregoing remarks have made it tolerably clear that some of the instances of diseases, which I have thus characterised, were simply sent here because an opportunity of sending them to England, with a view to final discharge, did not happen to occur at a convenient moment, and that no benefit was expected (and even often not possible), from such transfer.

9. *Trivial Diseases* appear to require no comment.

I will now attempt to state what I conceive have been some of the shortcomings of the establishment that have not yet been alluded to.

The condition of the ambulance wagons, in which patients are forwarded here from Valetta and other posts, was the subject of a correspondence. The wagons in question proved to be old Crimean ambulances, with India-rubber springs, and the India-rubber having lost its elasticity, practically they were without springs. The defect was corrected at once on its being pointed out.

With respect to defects or deficiencies in the building not already specially adverted to, and which may admit of improvement for the future, I may mention that all the wards on the third story are, in my opinion, more or less objectionable. In the winter months they are unwarmed, while in summer they are situated so near the roof, and are of such little altitude in themselves, viz., 12 feet 2 inches, that they are excessively hot, although the cubic space on paper looks large. Additional *cross* ventilation could, I think, be easily supplied.

Again, in almost all the wards the means of ventilation is entirely confined to the doors and windows, which leaves the air of the upper parts of the lofty wards quiescent. I think a few ventilators near the ceilings, or in the roofs, would be a material advantage, if judiciously placed and constructed.

Amusements.—In this important particular it appears to me the Sanatorium is wofully deficient, and I would beg to suggest that it is advisable measures be taken at as early an opportunity as may be for improvement.

The only means of amusement at present provided by the establishment for the patients are—1, A small supply of books, consisting of about 140 volumes, which were furnished by the Chaplain-General of the Army, and which are under the charge and care of the Chaplain of the establishment; 2, The men, who are sufficiently advanced in convalescenee to benefit by the proceeding, walk out every evening, when the weather permits, for about an hour, under the charge of a non-commissioned officer, who has orders to prevent straggling, and to keep clear of the situations where grog-shops are to be found,—in fact, to keep as much as possible in the open country. It is true that the non-commissioned officers and men of the Army Hospital Corps have succeeded in establishing among themselves a small reading-room, which is tolerably well supplied with papers and periodicals, and probably also true that in many instances the patients to a certain extent participate in its benefits, but only on sufferance.

Any other amusement the patients have had to find or provide for themselves, or such has had to be supplied from the respective regiments. A few games of dominoes, and so forth, with the occasional loan of a few newspapers, have been thus at times obtained. Bet I beg to be allowed very earnestly to press on the consideration of the authorities that suitable amusement is a very important remedial means towards convalescence after illness, and I would therefore beg very respectfully to submit the following suggestions, viz.:—

1. That the library be increased in extent, and in the range of its literary scope, which at present is very limited. Its superintendence cannot, I think, be in better hands than at present, as the Chaplain regularly visits the hospital three times a-week, and I feel confident that gentleman will not object to any additional labour that might be thus possibly cast on him; otherwise, I myself could easily make the necessary arrangements.

2. That a small supply of newspapers and periodicals be furnished for circulation through the wards.

3. That a supply of dominoes, draughts, backgammon, chess, and such like games be supplied by the public (as is, I believe, now the case in other general hospitals), as a regulated part of the hospital equipment.

4. That two or three sets of light quoits be supplied. The bastion before mentioned affords sufficient space for their convenient use.

5. That a couple of sets of ninepins of light weight be added. On the ground floor of the building a vacant space exists, which almost without alteration would do for their use.

6. That a ball-court be opened, with an occasional small supply of balls for hand-fives. On the ground floor there is a convenient spot, which, with very little alteration, might be adapted for this purpose, and I have always understood it was intended to be so appropriated.

7. That a bagatelle-board be supplied. Ward No. 18 might prove a suitable place for its reception, being of sufficient size for the purpose, although only adapted to accommodate two beds, and as a sleeping apartment the most objectionable ward in the house. I found, at the general convalescent hospital at Yarmouth, this was considered by the patients one of the greatest means of amusement supplied to them there, if, indeed, it was not more prized than any other.

The sick quarters for officers have not been occupied during the past summer.

Citta Vecchia, 29th January, 1862.

REPORT ON THE VENTILATION OF THE NEW BARRACKS AT GRAVESEND.

By T. G. Hewlett, Assistant-Surgeon in Her Majesty's Bombay Army, St. John Stanley, and Baynes Reed, Staff Assistant-Surgeons.

The Milton Barracks at Gravesend having been partially completed, and occupied by drafts of men from this garrison for the purpose of rifle instruction, the officer commanding, Major Deshon, was desirous of having experiments made to test whether in respect of supply and purity of air they justified the expectations that their scientific construction and increased accommodation had naturally raised.

Permission was accordingly kindly granted to us by the Major-General commanding the Division to proceed thither for the above purpose.*

We accordingly spent two nights at two different times in observing the movement of air in the rooms, and in analysing the air. The barracks are one-storied buildings, and at present consist of eight brick huts arranged in parallel lines facing the south-east, with a distance of 25 feet between each hut. These are at present occupied, and a similar number are in the course of erection.

Each hut is intended to accommodate fifty men and two non-commissioned officers. It is divided into two rooms by a transverse partition, and by the non-commissioned officers' rooms, which are separated by a wall from each other, but open into the barrack-room, which at its other extremity has a lavatory for six men and a night-urinal, separated from the barrack by a small passage. One of the barrack-rooms is 61 feet 8 inches long by 20 feet broad, and of an average height of 13 feet 3 inches, and is intended to hold twenty-six men; while the other, being 61 feet 8 inches long by 20 feet broad, but only of an average height of 12 feet, is intended for twenty-four men. The difference in height results from the gradual sloping of the ground on which these barracks are situated.

The non-commissioned officers' rooms are respectively 14 feet 10 inches long by 9 feet 5 inches broad.

Each barrack-room is furnished at either end with two outlet shafts of a superficial area of one square foot, which are designed to permit the exit of the foul air. They pass through the roof into the external air, where they are protected from the weather by a louvre. Some of the huts have also a raised ventilating ridge.

There are four windows on each side, placed opposite to each other, and one of smaller dimensions situated over the door; besides four Sheringham valves, two on either side, about nine feet above the floor, communicating with the external air. In the centre of each barrack-room there is an iron grate of the

* Sergeant Sylvester, of the Army Hospital Corps, accompanied us and assisted us very much.

most recent ordnance pattern. The chimney has an area of 0·5 square feet. Above it there is a louvre of a hot-air chamber, which communicates with the external air through twenty-seven perforated bricks, of which the area of the openings is equal to 2·16 square feet; while round the whole building extends a damp-proof course, at an average height of 1 foot from the ground.

The total area of all openings (shafts, valves, chimney, and hot-air shafts) is 6·22 square feet which allows for each man ·239 square feet.

On the night of our experiments we selected, at Major Deshon's suggestion, No. 19 barrack-room, where there were twenty-six men. In this room the total cubic space, after deductions for chimney, accoutrements, cots, and furniture, is 15670·94 cubic feet, which allows 602·7 cubic feet to each man. All the windows, nine in number, were closed; and the Sheringham valves, four in number, were open.

The fire had been put out at eight o'clock, and, therefore, at ten o'clock (the time of our first experiment) there was but little entrance of warm air from the louvre over the chimney into the barrack. Whatever current there was, was not sufficiently strong to turn the sails of the anemometer, and was imperceptible to the hand, though its presence was indicated by smoke.

The chimney proved a large discharge outlet, as shown by Neumann's anemometer. Taking the mean of twenty observations during ten hours, it showed that 1·7 cubic feet of air per second was passing by this means out of the barrack.

This gives an average total of 7812 cubic feet for every hour during the ten hours the experiments were being carried on. The discharge-shafts, as has been said, are of an assumed superficial area of 1 square foot, and are situated at either extremity of the barrack. The mean of twenty observations in the shaft situated at the north end shows that ·93 feet were leaving the barrack per second by this shaft, or 10951·4 per hour, during the time under investigation. The mean of a like number of experiments in the shaft situated at the south end gives an exactly similar result. We see, therefore, that the mean total amount of air discharged in any hour may be stated as—

By chimney	7812
By the shafts, 10981·4 × 2 ..	21962·8
Giving a total of ..	29774·8

Now, as there were twenty-six men in the barrack, these would give each man a mean of 1145·2 per hour.

The actual movement of the air at each hour indicated may be seen from the following Table :—

Movement of Air as determined by Neumann's Anemometer :—

Hour.	Temperature.			Air discharged by			Per Man per Hour.
	External.	Internal.	Difference.	Chimney.	Shafts.	Shafts and Chimneys.	
10 P.M.	41°	52°	11°	8568·	19353·6	27921·6	1073·9
12 A.M.	42°	52°	10°	8812·8	24305·2	33318·	1284·
2 A.M.	40°	52°	12°	7880·4	22435·2	30315·6	1165·9
4 A.M.	37·5	51°	13°5	8337·6	21254·4	29592·	1138·4
6 A.M.	34°	49°	15°	5666·4	20073·6	25740·	990·4

The direction of the wind was S.S.W., and its mean velocity two miles and a half per hour, which perhaps may account for the comparatively small amount of air each man received.

The foregoing remarks refer solely to the observations we made during the second night of our experiments. The mean movement of the air on the first night, during twelve hours under our observation, shows that 1·75 cubic feet were passing per second by the chimney out of the barrack-room.

This would give a mean of 8,114 cubic feet per hour. On this occasion five observations were made as regards the amount of air discharged by the shafts. These gave a mean of 1·35 cubic feet per second, which would give a

mean of 15912 cubic feet per hour. Assuming that the discharge in each shaft were the same, we should then have amount of air passing out—

	Feet.
By shaft 15912 × 2	31824
By chimney	8114
Giving a total of ..	39938

On this occasion, too, there were twenty-six men in the barrack-room. Each man, therefore, would be supplied, assuming the above figures to be correct, each hour with 1536 cubic feet. The mean external temperature on that night was 51° 7, and the mean internal 56° 5 ; difference, 4° 8.

The direction of the wind was S.S.W. Its mean velocity 4·8 miles per hour during the twelve hours under observation.

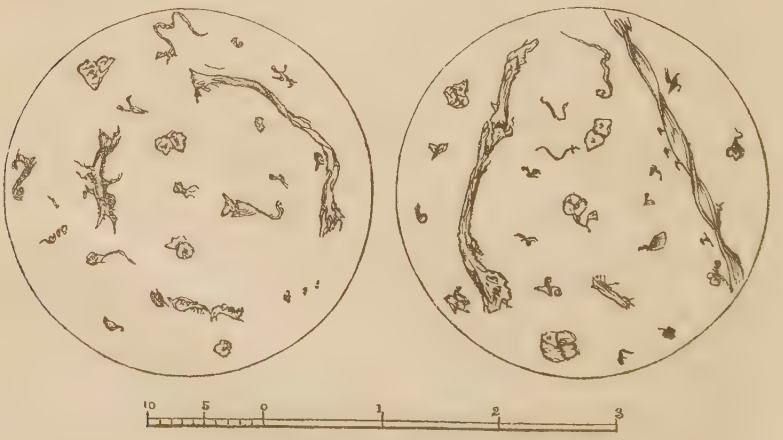
To discover whatever organic impurities might be suspended in the barrack-room, we drew 8·088 cubic feet of air through a solution of permanganate of potash of known strength (1 cubic cent. = ·00002 grammes) by means of an aspirator, connected by India-rubber tubing to the bottle containing the solution. The liquid became almost decolorized during the experiment, and a deposit occurred. On placing some of the sediment under the microscope, we found many scales of pavement epithelium, pieces of cotton fibre, shreds of wool, and amorphous bodies in large number.

We believe that this method of examining the floating impurities of the atmosphere has only recently been introduced ; but it appears to us that its importance can hardly be overrated, as by its means the existence in the atmosphere of such foreign bodies as pus-cells, either fresh or dried up, and only wanting certain hygrometric conditions to become active, has been discovered. These would, of course, account for the diffusion of purulent ophthalmia, under circumstances which have hitherto been inexplicable. We need hardly mention the important influence that these microscopical atmospheric impurities may exert in pulmonary affections, and we may fairly hope that future experiments will be undertaken to demonstrate the various poisons of miasmatic origin, and that before very long the specific poisons of cholera, paludal fevers, and other zymotic diseases, will be described.

In this barrack-room the suspended matters appear to us to be rather numerous ; but as no standard of comparison has yet been given, it is difficult to express a decided opinion on this point.

With regard to organic matter, all we can say is, that in about 8 cubic feet of air enough existed to nearly destroy ·00002 grammes of permanganate of potash.

The accompanying photographs, from specimens drawn with the camera lucida, faithfully represent the character of these organic impurities. The scale is attached :—



Scale of 100ths of an inch.

Five experiments were also undertaken to determine the hygrometrical condition of the atmosphere :—

TABLE to show Hygrometrical Conditions of Air :—

Hour.	External.				Internal.			
	Dry Bulb.	Wet Bulb.	Dew Point.	Humidity.	Dry Bulb.	Wet Bulb.	Dew Point.	Humidity.
10 P.M.	41·0	40·0	38·7	92	52·0	51·0	50·0	93
12 P.M.	42·0	41·0	39·8	92	52·0	51·0	50·0	93
2 A.M.	40·0	39·0	37·7	92	52·0	50·0	48·0	86
4 A.M.	37·5	37·0	36·3	96	51·0	48·0	49·9	80
6 A.M.	34·0	33·5	32·4	94	49·0	47·0	44·8	86

A drizzling rain fell during the early part of the night, and the sky was very much overcast. The mercury in the barometer was very low. The mean of five observations stood at 28·99. The greatest heat in the barrack-room, as shown by Phillips' maximum was 54° ; the greatest cold internally 45°5′, externally 33°. There was a difference, then, of temperature in favour of the room of 12°5′.

A chemical analysis was made to test the amount of carbonic acid gas in the air of the barrack-room. A somewhat larger amount was found than was expected, the mean of five experiments being 1·25 volume per 1000 volumes of air. This large amount may, we presume, be to some degree referable to the number of men who were smoking before going to bed, with the doors, windows, and valves closed ; and points out, we think (if we may be permitted to say so),the urgent necessity that exists for there being proper dormitories for the men where no smoking would be allowed. We would also observe that we ourselves remained about twenty minutes at each observation in the barrack, and that some of our number were smoking during the time. We did not sufficiently think at the moment that this would to a certain extent vitiate the observation.

The barracks are erected on a large tract of land, 1,250 feet long by 850 feet broad. This site is completely open to the east, and is bounded on the north by the North-Kent Railway. A lane separates it from the town on the west, while at the south-west angle rises a small hill covered with houses. This hill is composed of clay, with a green sand subsoil, under which, at the depth of about fifteen feet from the surface, is the chalk. The ground on which the barracks stand slopes gradually down to the river ; thus presenting natural facilities for drainage which has been taken advantage of in the artificial conveyance of the sewage.

The barracks possess every convenience that modern skill can suggest. The latrines, two in number, are conveniently situated in the centre of the blocks, and are built with due regard to privacy, on Mr. Jennings' patent ; while the sides of the wall that inclose them are fitted up as urinals. Water is freely supplied for flushing them. In the same line with the latrines, but with ample distance between them, are situated the cook-house, and bath-house containing six baths. Major Deshon informs us that the men used the baths with great enjoyment during the summer.

The married men's quarters are erected at the east end, and are separated from each other and from the huts by a distance of 30 feet. Their rooms are 13 feet 3 inches broad by 13 feet 6 inches, and of a mean height of 11 feet 6 inches. Taking 600 cubic feet as the least amount of air that can be allowed for an adult, this would give sufficient space for three grown-up people, which, in the event of a soldier having a large family would be manifestly insufficient. It would, therefore, seem that an upper story to the married men's quarters would be highly desirable.

The women's bath-room and latrines, the laundry, storehouses, and canteen, will form the southern boundary ; whilst the officers' quarters extend along the west flank. The diagram at the end may be useful in explaining the position of these barracks.

The drinking-water supplied to these barracks is obtained from a well sunk 127 feet into the chalk, and is then conveyed by iron pipes to an open iron reservoir supported by a brick wall 14 feet high. It has an agreeable taste, is without smell or sediment, and is sparkling and transparent.

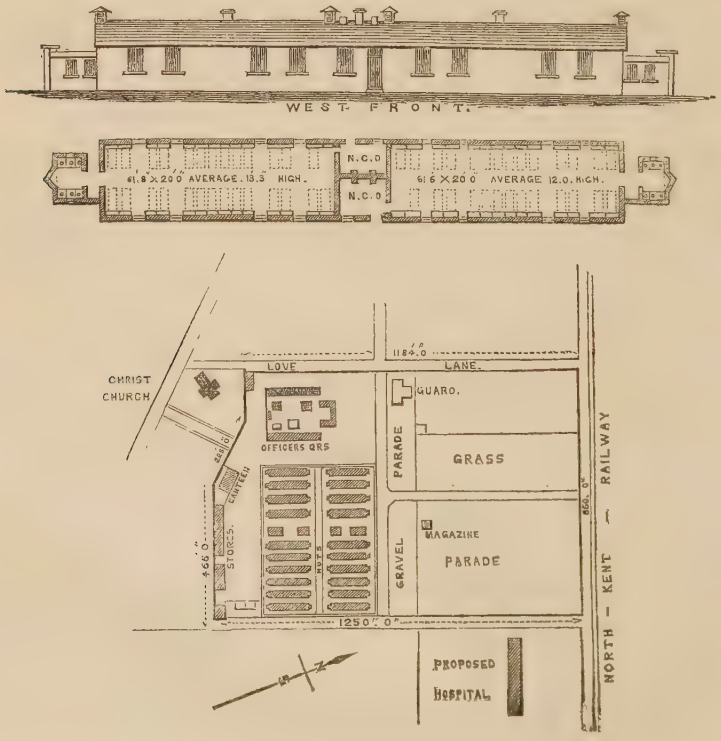
Total permanent hardness (according to Clarke's scale 1° = 1 gr. of carbonate of lime) ..	16·5
Hardness after boiling	4·2

Analysis of Constituents.	Grains per Gallon.
Carbonate of Lime .. .. .. =	14·08
Carbonate of Magnesia .. .. =	1·17
Chlorine .. .. =	2·25
Sulphuric Acid .. .. .. =	None.
Iron .. .. =	A small quantity.

From the above results we should say that this water is a good carbonate of lime water, and is wholesome to drink. We would, however, respectfully suggest that the reservoir be covered in; as, from its being exposed to the air, any organic impurities that may be brought into contact with it would be arrested, and very possibly prove an easily preventible source of disease.

Thinking that it might prove not uninteresting as an appendix to this report, we have attached a Table of some similar experiments we undertook in one of the casemate-rooms in Fort Pitt.

In conclusion, we would wish to express our thanks to Major Deshon for his earnest co-operation and kindness in assisting us in making the above experiments.



Hourly Examination of the Air, during the night of November 25th, 1862, in two Casemate Wards at Fort Pitt General Hospital, Chatham.

Date.	Hour.	Ward.	Cubic Space.			Amount of Air discharged per Hour through Chimney.	Number of Men.	Amount of Air discharged per Man per Hour in Cubic Feet.	Carbonic Acid per 1,000 Volumes.	Means of Ventilation.	External Air.										Internal Air.							
			Total Cubic Space in Feet.	Cubic Space after deducting for Furniture and Bedding.	Allowance of Cubic Space per Man.						Barometer.	Dry Bulb.	Wet Bulb.	Difference.	Dew Point.	Tension.	Vapour in a Cubic Foot of Air.	Humidity.	Direction of Wind.	Velocity of Wind in Miles.	Barometer.	Dry Bulb.	Wet Bulb.	Difference.	Dew Point.	Tension.	Vapour in a Cubic Foot of Air (Grains.)	Humidity.
	P.M.																											
25th	8	F.	11,770	11,532	1048·1	11,808	11	1,072	1·44		30·01	40	37·0	3·0	33·1	0·189	2 2	76	E.N.E	1·5	30·02	53·0	48	5·0	43·0	0·277	3·1	69
,,	10	,,	,,	,,	,,	11,880	,,	1,080	1·31	Windows at each end.	30·00	40	38·0	2·0	35·4	0·207	2·4	84	,,	·0	30·01	53·0	48	5·0	43·0	0·277	3·1	69
,,	12	,,	,,	,,	,,	10,627	,,	966	1·55	Two doors opposite.	30·00	41	38·0	3·0	34·2	0·197	2·3	77	,,	·0	30·03	52·5	49	3·5	45·4	0·305	3·5	78
	A.M.									One grate (good fire till 11 P.M.)																		
26th	2	,,	,,	,,	,,	8,265	,,	752	1·70		29 99	37	36·0	1·0	34·6	0·200	2·3	91	,,	·0	30·02	53·0	48	5·0	43·0	0·277	3·1	69
,,	4	,,	,,	,,	,,	14,400	,,	1,309	1·08	One gas-jet, with outlet tube.	30·00	38	37·0	1·0	35·6	0·208	2·4	91	,,	·0	30·00	52·0	48	4·0	43·9	0·287	3·3	74
,,	6	,,	,,	,,	,,	12,266	,,	1,114	1·51		30·00	37	37·0	0·0	37·0	0·220	2·6	100	,,	1·3	30·01	53·0	51	2·0	49·0	0·347	3·9	86
	P.M.																											
25th	9	G.	11,766	11,524	1152·4	14,860	10	1,486	1·26		30·00	39	38·0	1·0	36·7	0·218	2·5	92	N.E.	1·3	30·01	56 0	50	6·0	44·4	0·295	3·3	65
,,	11	,,	,,	,,	,,	15,640	,,	1,564	1·03		30·00	39	37·0	2·0	34·4	0·199	2·3	84	E.N.E	2·7	30·01	54·0	49	5·0	44·1	0·288	3·3	69
	A.M.																											
26th	1	,,	,,	,,	,,	12,260	,,	1,226	1·60	Same as above, but one window open all night.	30·00	39	38·0	1·0	36·7	0·218	2·5	92	,,	0·7	30·00	52·0	46	6·0	39·9	0·246	2·8	64
,,	3	,,	,,	,,	,,	12,260	,,	1,226	1·52		30·00	39	37·0	2·0	34·4	0·199	2·3	84	,,	8·0	30·00	51·0	47	4·0	42·8	0·276	3·1	74
,,	5	,,	,,	,,	,,	12,260	,,	1,226	1·52		29·99	37	37·0	0·0	37·0	0·220	2·6	100	,,	10·2	30 00	50·0	47	3·0	43·8	0·286	3·3	80
,,	7	,,	,,	,,	,,	18,000	,,	1,800	1·04		30·01	37	36·5	0·5	35·8	0·210	2·4	95	,,	3·6	30·01	52·0	47	5·0	41·4	0·266	3·0	69

REMARKS.

Ward F.—Six cubic feet of air were drawn through by the aspirator into a solution of glycerine, and afterwards examined microscopically: large quantities of epithitial scales, fibres of cotton, wool, and feathers were found, besides some amorphous bodies. A very close smell throughout the night.

Ward G.—Four cubic feet of air were drawn through an areoscope on to a solution of pure glycerine, when the same results were obtained as above. Rather close smell, but not so disagreeable as the above.

REPORT ON "CARNISET,"

A Concentrated Food, prepared by Messrs. Gehrig and Grünzig, of Berlin.

By the Professors of the Army Medical School.

By order of the Under Secretary of State for War, the Purveyor-in-chief forwarded to Chatham, for trial, 10 lbs. of a concentrated food, to which the inventors, Messrs. Gehrig and Grünzig, of Berlin, have given the name of "Carniset."

In a letter accompanying this food, Messrs. Gehrig and Grünzig state that "it contains in a concentrated form the exact proportion of all such nutritious and digestive ingredients as are necessary to sustain man in perfect health. Three ounces are sufficient for one meal, containing the strength of about 1 lb. of beef. It is boiled for 15 minutes in a pint to a quart of water, and, in order to give it more substance, one adds some biscuit or bread."

It is also stated that for convenience the food had been made into the "lentil form," and that it consisted of two kinds—"bouillon," intended for dinner, and "cocoa, which is equally substantial," intended for breakfast.

As Messrs. Gehrig and Grünzig referred to trials which had been made by order of the Prussian War Office, and to a chemical analysis by Professor Sonnenschein, application was made to them for these reports, and in due time the following letter, addressed to them, and an analysis by Professor Sonnenschein, were forwarded.

The letter, translated, is as follows:—

"Royal Prussian War Office, Department of Military Economy, Berlin, *4th December*, 1862.

"Sir,—With regard to your letter of the 1st instant, we have to inform you that the experiments made here with the article of food invented by you, and designated "carniset," led to the following results, viz.—

"It is at least equally nutritious with other similar surrogates already known to us. It furnishes, with the addition of ½ to ¾ of an ounce (Prussian) of salt, and ½ lb. of bread (Prussian), per portion, a meal on the whole palatable and nutritious, and it might, therefore, in cases of emergency, be employed as a temporary substitute for the usual fare.

"But we regret to be unable to comply with your wish to furnish you with copies of the extensive documents drawn up in connection with these experiments, they being neither intended, nor fit for communication to private parties.

"Should—what is not known to us—the Marine Office have also instituted experiments with your carniset, it will rest with you to apply to that Office for the papers you require. (Signed*) "Hering."
"Hochheime."

Professor Sonnenschein's analysis is as follows:—

	In 100 parts.	
Water	9·00	
Organic substances:		
Carbon	36·76	
Hydrogen	6·68	
Nitrogen	3·73	
Oxygen	33·79	
		80·96
Inorganic substances:		
Silicic acid	0·22	
Sulphate of lime	0·25	
Phosphate of lime	0·14	
Phosphate of peroxide of iron	0·18	
Chloride of sodium	5·11	
Chloride of potassium	3·94	
		9·84
		99·80

* The signatures are almost illegible.

No one will doubt that the use of food of this description is likely to be much extended in future wars. The ease of transport, the possibility of men carrying many days rations without fatigue, and the rapid way in which such food can be cooked, or can be eaten uncooked on emergencies, are all very strong recommendations. It is, indeed, more than a century ago that the celebrated naval surgeon, Lind, strongly recommended the use of concentrated food of this kind, for soldiers and sailors, in war, and it is unfortunate that the importance of this advice was not long ago perceived.

It was, therefore, with much interest that we received this carniset, and prepared to test its alleged powers.

We have examined it in three ways, one of our number, the Professor of Hygiene, taking the management of the investigation.

1. We have made a chemical examination, as far as it was necessary for our purpose.

2. We have examined it microscopically.

3. We have tested it practically in the following way :—

Four gentlemen of the Staff at Fort Pitt undertook to observe for a considerable number of days the varying weights of the body, and the amount of food and drink daily taken by them on ordinary diet.

At the same time, as the elimination of nitrogen chiefly occurs by the urea, it was considered desirable to determine the daily excretion of this substance, and of some of the other urinary ingredients. Subsequently, these gentlemen* lived on carniset for 7 or 5 days, observing the same particulars as during the period on ordinary diet ; and as 3 ozs. of carniset were stated to be as enough for a meal, it was decided to give 6 ozs. daily, and 10 ozs.† of bread. This was the quantity taken by two gentlemen ; subsequently the allowance was raised to 8 ozs. daily, and 10 ozs. of bread.

All these particulars are given in the Tables herewith appended.

I.—The Chemical Examination.

As two kinds of carniset were sent, they are distinguished by the terms "bouillon" and "cocoa" carniset. The determinations of nitrogen were very carefully made by Dr. Woods, Staff Assistant Surgeon.

Bouillon Carniset.	In 100 parts.
Solids	83·01
Water	16·99
	100·00

	In 100 parts.
Nitrogen 5·6 per cent. = nitrogenous substances (5·6 × 6·3) ..	35·28
Fatty substances	4·25
Salts	8·8
Starch, sugar, and other substances undetermined	34·68
Water	16·99
	100·00

The salts consisted almost entirely of chlorides of sodium and potassium, with a little iron, lime, and sulphuric and phosphoric acid.

Cocoa Carniset.	In 100 parts.
Solids	78·48
Water	21·52
	100·00

* These four gentlemen, Mr. Striedinger, and Doctors Douglas, Oliver, and Flood, took a great deal of trouble in carrying on these experiments very carefully. Sergeant Sylvester, of the Army Hospital Corps, made many of the examinations of the urine, and assisted, also, in various other ways.

† One ounce Prussian is equal to 1·0311 ozs. avoirdupois.

	In 100 parts.
Nitrogen 3·36 per cent. = nitrogenous substances (3·36 × 6·3)	21·168
Fatty substances	4·09
Starch, sugar, and other substances	51·242
Salts	2·
Water	21·5
Total	100·00

In looking over these analyses, it is at once evident that both kinds of carniset are less "concentrated" than might have been expected; 17 and 21 per cent. of water is a great deal, and lessens by nearly 1-5th the nutritive value of the food. Of course the drier the food in a given bulk, the more nutritious it is.

The amount of nitrogen is certainly large, especially in the bouillon, and, so far, the carniset must be considered nutritious. If we assume that a healthy, adult young man, under ordinary conditions, will require about 280 grains of nitrogen in 24 hours, it follows that as 1 oz. avoirdupois of carniset contains 24·5 grains of nitrogen, about 5,000 grains, or nearly 11½ ozs. avoirdupois of bouillon carniset would be required to cover the waste of nitrogen, an amount very much greater than that stated to be sufficient by the inventors. If cocoa carniset were used, the quantity must be still more, as the percentage of nitrogen is less.

The amount of carbon, taken from Professor Sonnenschein's analysis, is 36·7 grains per 100, or 160·5 grains in 1 oz. A strong healthy man will require, at the very least, 3,500 grains, or 8 ozs. avoirdupois of carbon daily, to supply the waste of carbon (and this is in reality below the mark). Now, this would necessitate the use of nearly 22 ozs. avoirdupois of carniset.

It is evident, from the amount of fat and starch, that this food is greatly deficient in carboniferous material, and hence, probably, the recommendation that bread or biscuit should be also taken.

The amount of fat is, indeed, greatly below what is requisite in a sound diet. A healthy man requires at least 1½ to 2 ozs. of fat, and yet he will receive in this food only 18½ grains in 1 oz. avoirdupois. It will be seen, then, what an immense amount of carniset must be given to make up the proper amount of fat.

The carniset is also deficient in salts; phosphates of lime, and magnesia, and iron, are all in very small quantity, and the vegetable salts which by decomposition yield carbonates, appear to be altogether wanting; so that if this food were used for any continuance, the man would inevitably become scorbutic, unless fresh or dried vegetables were also supplied.

From the chemical examination it may, then, be inferred, that this food is strongest, so to speak, in its nitrogenous constituents, and that if it be ever used, it can be only as a makeshift for a short time, and then in much larger quantities than those stated by its inventors.

II.—The Microscopical Examination.

The following appearances were seen in both the bouillon and the cocoa carniset:—

1. Numerous starch grains, of sizes varying from a very small round point to a large grain; in shape rounded, or slightly lenticular or oval, with an indistinct central hilum, and no decided concentric markings. They appeared to be either wheat or barley starch grains, and made up two-thirds or three-fourths of the whole carniset.

2. A little envelope, from wheat or barley, indistinct, and very small in quantity.

3. Irregular and rounded dark orange-yellow masses, without regular form or size.

No muscular fibre could be seen, and very few, if any, fat globules.

It is therefore evident that a cereal has been largely used; the yellow masses are probably prepared extract of meat; it cannot be meat simply, otherwise muscular fibres would have been seen.

III.—Practical Examination.

As, after all, the inference from a chemical or microscopical examination might mislead, the practical test was looked forward to with great interest. It was of course limited to this point, viz., whether a man could be maintained in health and vigour for a short time on the carniset, and if so, on what quantity.

One objection was soon found out, viz., that the taste is to many people highly objectionable. One of the gentlemen could scarcely continue the trial; another, though very hungry, could hardly eat the bouillon; others did not dislike it so much, but no one found it pleasant. This is a most serious objection to any food. It was, however, cooked very readily and rapidly, 15 or 20 minutes being sufficient time.

Experiments on Mr. Striedinger.

This gentleman, aged 32, is an extremely healthy and vigorous man, very active, both in mind and body.

1. *Amount of food.*—From experiments carried on during 22 days, it was found that he required daily 40½ ozs. avoirdupois of so-called solid food;* calculating the water in this, and adding it to the liquid drank daily, the ingesta of this gentleman were, in 24 hours—

	ozs. av.
Water-free food	22·337
Water	88·86
	111·197

In other words, the body required $\frac{1}{118}$ of its own weight of water-free solids, and each lb. weight of the body received in 24 hours 0·13558 oz. avoirdupois of solid, and 0·53936 oz. avoirdupois of liquid food.

Six ozs. of carniset (3 ozs. bouillon, and 3 ozs. cocoa), containing 117·6 grains of nitrogen, with 10 ozs. of bread, containing 58·18 grains of nitrogen, were then given for 7 days. Beer, which had been taken in the previous series, was continued. The carniset was digested without pain or uneasiness and this was the case with the other gentlemen. The function of the bowels continued normal.

	ozs.
Amount of daily water-free food, in the carniset, bread, and beer	11·69
Amount of water (in carniset, and bread, and as drink).. ..	76·6
	88·29

The water free food was therefore only half the former weight, and the body received $\frac{1}{221}$ of its own weight (161·75 lbs. in this series) in water-free food, instead of $\frac{1}{118}$; each lb. weight of the body received 0·0722 ozs. of solid, and 0·4735 ozs. of liquid food. The amount of nourishment passing into the system was therefore so greatly lessened, as to make it certain either that this gentleman had been previously overfed, or that he would show in some way evidence of imperfect nutrition.

During the 7 days, however, that the carniset was continued, the health was perfect; mind and body were alike vigorous, and on the 7th day a walk of 16 miles was taken after a long day's work, to test the power of the body, and was supported without fatigue. That the carniset will, therefore, for this length of time, support the body to some extent, is certain. But nevertheless, it did not suffice, as appears from the next headings.

2. *Weight of the body.*—The mean weight of the body (average of 22 days) on normal diet was 164·75 lbs. avoirdupois.

	lbs.
The highest weight was..	166·
The lowest	163·5
The range was therefore	2·5

* For the exact amount of meat, bread, &c., see the annexed Table. The term "solid food" is used to imply food with its usual percentage of water, and is used in opposition to anhydrous or water-free food.

During the use of the carniset the body declined in weight, and at the end of the 7 days, no less than 5½ lbs. had been lost.

The mean weight of the 7 days on carniset was 161·75 lbs., or 3 lbs. below the normal mean. It was therefore quite clear that the body was wasting in consequence of insufficient nutriment, although, probably on account of the previous excellent condition, there were no subjective feelings of illness or weakness.

3. *Urinary Excretion.*—The excretion of several urinary ingredients is recorded in the Table. In order not to lengthen this Report, we will merely observe that the normal daily excretion of urea (mean of 17 days) was 660·8 grains, or 4·0109 grains to each lb. of body weight.

During the carniset (7 days) the excretion sank greatly, so that it never even reached the minimum of the previous 17 days. Its mean amount was only 466·04 grains, or 194·7 grains less than the former series. This gives 2·88 grains to each lb. weight of the body, or 1·13 grains less than before. The urinary solids, the chloride of sodium, and the free acidity, were all greatly lessened (see Table).

With the urea there passed off during the carniset series more nitrogen than entered with the food. Thus, in this urinary ingredient alone, 217·39 grains of nitrogen were eliminated daily; the amount passing in, in the carniset and bread, was 175·78 grains, so that 32 grains were derived daily from waste of the nitrogenous tissue (muscles), which was not covered by the food. In addition, there was, of course, nitrogen excreted by the uric acid, and other constituents, of which no account is taken, so that there was a very considerable daily destruction of the body going on without repair.

It is therefore quite certain that 6 ozs. of carniset, and 10 ozs. of bread, with beer, formed a very insufficient nourishment, and that if the food had been persevered in, this gentleman would have shown in a short time unequivocal signs of debility. In the time, however (7 days), no obvious effect was produced, either on the circulation, or the general feelings, or the bodily strength.

Experiments on Dr. Douglas, Æt. 22½.

This gentleman enjoys the most perfect health, and is extremely active, both in mind and body. As he weighs, however, only 132 lbs., it was thought that possibly 6 ozs. of carniset, and 10 ozs. of bread, with beer, would maintain his weight. It turned out, however, that this was not the case, and that he required even more than Mr. Striedinger, and had a more rapid metamorphosis of tissue.

1. *Amount of food.*—From experiments carried on during 7 days, it was found that 41·13 ozs. avoirdupois of so-called solid food were taken daily, and 44·5 ozs. of fluid. Calculating the amount of water in the solid food, and adding it to the liquid drank, it is found that this gentleman took daily—

	oz. av.
Water-free food	25·21
Water	60·42
Total ingesta	85·63

The body therefore required $\frac{1}{84}$ of its own weight of water-free solids, and each lb. weight of the body received in 24 hours 0·191 oz. of water-free solids, and 0·457 oz. of liquid food. It will be observed that this gentleman, though less heavy, required more solid food than Mr. Striedinger.

Six ounces of carniset, and 10 ozs. of bread, with beer, were then taken daily for 5 days; on another day, 3 ozs. only of carniset were taken, and a little more bread, making the mean for the 6 days 5½ ounces of carniset, 10·33 ozs. of bread, 13 ozs. of beer, and 62 ozs. of water.

Calculating the amount of water in the carniset, bread, and beer, we obtain as the ingesta in each 24 hours—

	oz.
Water-free food	11·42
Water	79·22
	90·64

Or very nearly the same as that taken by Mr. Striedinger.

As the mean weight of the body was 129 lbs. during the 6 days of carniset, the body received daily $\frac{1}{181}$ of its own weight in water-free food; each lb. weight of the body received 0·0885 oz. avoirdupois of water-free food (instead of 0·191 oz. under ordinary diet), and 0·614 oz. avoirdupois of liquid food. There was rather an excess of liquid taken, as compared with the former period, and this was attributed to thirst, produced by the salt in the bouillon.

As in the former case, it was quite evident that this amount of food was insufficient. In the first 3 days this gentleman felt well and vigorous, as usual, then, after a great deal of exercise, and missing one meal of carniset, he felt languid, and for the remaining time he did not feel in his usual health, nor did the feeling of perfect health return till 2 or 3 days after his recurrence to his usual diet.

2. *Weight of the body.*—During the 7 preliminary days the weight varied very little. The mean weight was 132 lbs.

	lbs.
The maximum was	132·75
Minimum	131·
Range	1·75

During the use of the carniset the weight declined almost regularly, from 131·25 lbs. at the commencement, to 127·5 lbs. at the close; no less than 3·75 lbs. being thus lost in 6 days.

The mean weight of these 6 days was 129. As in Mr. Striedinger's case, it is quite clear that 5½ ozs. of carniset, and 10 ozs. of bread daily, could not maintain the weight; and owing, perhaps, to this gentleman's larger appetite, and more rapid metamorphosis of tissue, the debilitating effect of the lessened food was more marked in him than in Mr. Striedinger.

3. *Urinary Excretion.*—The urinary excretion was very regular in this gentleman; the range of the urea being only from 58·82 grammes to 41·4 grammes.

On an average of 7 days the daily excretion of urea was 706·8 grains, or 5·35 grains of urea to each lb. weight of the body, being an unusually large amount, and corresponding with the good appetite, and great amount of food taken.

During the use of the carniset the urea fell to a daily average of 525·8 grains, or 181 grains less than in the former series. Each lb. weight of body excreted 4·07 grains, or 1·28 grains less than before.

More nitrogen passed off with the urea than entered the body, and here, also, therefore, the body was disintegrating without being repaired.

	grs. of Nitrogen.
Thus, there entered daily	164·34
Passed off in the urea	245·36
Nitrogen furnished by the body in the urea alone	81·02 grains.

More nitrogen was furnished by the body in this case than in that of Mr. Striedinger, doubtless because the physiological tissue change is more active than in the latter gentleman.

Experiments on Mr. Oliver, Æt. 25.

As 6 ozs. of carniset were evidently not sufficient, the quantity was increased to 8 ozs. daily, with the same amount of bread, and with beer.

It was impossible for this gentleman to weigh his food, therefore only the weight of the body, and the ureal excretion, were determined in the preliminary experiments, which lasted 12 days.

Like all the rest, this gentleman was in perfect health and vigour.

1. *Weight of the body* (12 days) :—

	lbs.
The mean weight was	140·1
The maximum was	140·5
Minimum	139·75
Range	0·75

The variation in weight was therefore extremely small.

During 5 days, with 8 ozs. of carniset, and 10 ozs. of bread daily, the body lost 3·3 lbs. in weight; it fell from 140·5 to 137·2 lbs. The mean weight during the time was 139·25 lbs. As previously, the weight had remained so remarkably uniform, it is perfectly certain that even 8 ozs. of carniset are insufficient.

During the 5 days this gentleman felt in his usual health.

2. *Urinary Excretion.*—The urea (mean of 11 days) averaged 622 grains daily, or 4·44 grains to each lb. weight; during the use of the carniset it fell to 355·5 grains daily, or 2·55 grains to each lb. weight of the body.

	grs.
The amount of nitrogen passing by the urea was	165·9
„ „ taken in the food	215·6

So that in this case the nitrogen in the food more than covered the amount of nitrogen in the urea.

The elimination in some other way, perhaps by excess of exit of carbon, was, however, not covered by the amount of food.

Experiment on Dr. Flood.

This gentleman, also in perfect health, occupied 10 days in the preliminary experiments, and then lived for 5 days on 8 ozs. of carniset, and 10 ozs. of bread daily. It was impossible for him to weigh his food.

1. *Weight of the body.*

	lbs.
Mean weight of the body on normal diet	150·85
Maximum weight (10 days)	152·
Minimum	150·
Range	2·

From the period of commencing the carniset to the end he lost 2½ lbs., but on one day he gained a lb., being the only case in which there was a gain in weight. The mean weight was 148·85.

2. *Urinary Excretion.*—The mean daily ureal excretion of the 10 preliminary days was 558·9 grains, or 3·7 grains to each lb. weight of the body. During the use of the carniset it fell to a mean of 437·4 grains, or 121 grains less; this gives 2·9 grains of urea to each lb. weight.

	grs.
Amount of nitrogen passing out with urea	204·12
„ „ entering	215·6

So that in this case the entering nitrogen covered the loss by the urea. In spite of this the body lost weight.

This gentleman found the carniset not nearly sufficient for his appetite, and also did not feel quite so strong as usual; still, there was not much alteration from his usual health in this respect.

From all these experiments it appears, therefore, certain, that the amount must be much more than even 8 ozs. daily, if the weight of the body, and the amount of the ureal excretion, are to be sustained; but even then the defects of the carniset as food make it very doubtful whether it could be depended on for more than a few days. Its deficiency in fat and certain salts must render it ill adapted for long continuance.

In conclusion, we beg to report—

1. That the carniset is easily cooked, and is easily digested, and does not cause diarrhœa.

2. That its flavour, especially of the bouillon, is disagreeable to most persons, and in some cases produces even nausea, and almost inability to take the carniset, and that as the flavour of food is a very important point, this is a serious objection.

3. That in a chemical point of view the food cannot be considered a perfect one.

4. That men can live for some few days in apparent health and vigour on 6 or 8 ozs. of carniset, and 10 ozs. bread.

5. That there is, however, with this quantity, a considerable loss of body weight during the time, a greatly lessened passage of nitrogen from the system, and in some cases an absolute wasting of nitrogenous tissues, without repair, which could not go on for any long period without inducing weakness and its consequences.

THOMAS LONGMORE,
Deputy Inspector-General, Professor of Military Surgery.

E. A. PARKES, M.D., F.R.S.,
Professor of Military Hygiene.

W. C. MACLEAN, M.D., D.I.G.H.,
Professor of Military Medicine.

WILLIAM AITKEN, M.D.,
Professor of Pathology.

February 9, 1863.

MR. STRIEDINGER, æt. 32. Height, 5 ft. 10 in. Girth at Nipples, 37 to 39 inches. (Full Inspiration and Full Expiration.) Vital Capacity (Hutchinson's Spirometer), 250 to 260 cubic inches. 1st SERIES.—USUAL DIET.

Date.	Weight on rising on 2nd day named.	Pulse. (lowest to highest).	Solid Food in 24 hours—ozs. avoir.	Liquids in 24 hours, in fluid ounces.	Urine.						Nature of Food.	
					Total quantity in C. C.	Specific gravity at 60°.	Solids in grammes. (evapn.)	Urea in grammes.	Cl Na in grammes.	Acidity, grammes of Crystallized Oxalic Acid.	Average amount of Food. (Mean of 22 days.) Solids.	Drink.
Nov. 10	165·75										Cooked.	
„ 10–11	166·	72–80	40·5	54							ozs. av.	
„ 11–12	165·5	80–100	40·5	74							Meat .. 12·9	Inf. Coffee 20·19
„ 12–13	164·75	..	40·5	74							Potatoes .. 12·3	Milk .. 3·
„ 13–14	163·75	62–100	..	..	1920	1018·25	81·6	49·9	14·4	2·8	Bread .. 10·6	Beer .. 17·1
„ 14–15	165·25	58–80	40·5	74	1100	1026·75	..	46·53	12·1	3·36	Sugar .. 1·	Water .. 4·7
„ 15–16	165·	57–65	40·5	74	2130	1019·5	85·4	44·73	18·1	3·6	Butter .. 1·2	Inf. Tea .. 25·7
„ 16–17	164·75	58–80	40·5	60	1817	1018·5	..	37·02	18·23	3·3	Cheese .. ·5	
„ 17–18	165·	58–81	40·5	74	1721	1015·5	64·53	37·	9·03	3·39	Extras .. 2·	70·69
„ 18–19	165·	64–80	40·5	74	1820	1017·5	..	39·13	15·74	3·34	40·5	
„ 19–20	165·5	57–78	40·5	84	2200	1016·25	68·4	49·5	16·83	4·3		
„ 20–21	165·5	..	40·5	74	2010	1017·	..	38·19	11·05	3·57		
„ 21–22	165·	..	40·5	84	2150	1019·5	63·42	38·7	26·85	2·89		
„ 22–23	164·75	..	40·5	74	2350	1014·5	..	54·05	33·7	2·8		
„ 23–24	164·75	..	40·5	74	2120	1017·5	65·79	50·66	18·12	4·08		
„ 24–25	164·5	..	40·5	74	1920	1015·	..	34·56	11·52	3·5		
„ 25–26	165·	..	40·5	64	1600	1017·	64·16	35·2	10·80	2·77		
„ 26–27	164·5	..	40·5	70	1920	1016·5	..	42·04	16·99	3·33		
„ 27–28	163·75	..	40·5	58	1440	1024·	75·6	43·92	11·88	2·19		
„ 28–29	164·5	..	40·5	74	2100	1020·	..	46·2	21·	4·5		
„ 29–30	164·25	..	40·5	84	2300	1014·5	69·	40·25	13·8	3·28		
„ 30–31	163·5	..	40·5	54	1005	1026·5	..	32·76	10·55	2·97		
Dec. 1–2	164·	60–80	40·5	74	1460	1020·	62·7	34·456	11·31	2·32		
„ 2–3	164·	70–100	40·5	64	1280	1021·	..	37·12	9·92	2·98		
Mean	164·7	..	40·5	71	1922	..	70·06	42·8	16·48	3·36		
Maximum	166·	..	..	84	2350	..	85·4	54·05	33·7	4·5		
Minimum	163·5	..	..	54	1005	..	62·7	32·76	9·03	2·19		

2nd Carniset Series.

Date.	Weight on rising on 2nd day.	Pulse.	Solid Food in 24 hours—ozs. avoir.	Liquids in 24 hours, in fluid ounces.	Urine.						Nature of Food.	
					Total quantity in C. C.	Specific gravity at 60.	Solids in grammes.	Urea in grammes.	Cl Na in grammes.	Acidity, grammes of Crystallized Oxalic Acid.	Average amount of Food.	
Dec. 3–4	162·75	..	6 ozs. carniset, 10 ozs. bread	64	1114	1020·	41·95	32·26	9·43		Cooked. Average Food of 7 days—6 ozs. avoir. carniset, 10 ozs. bread = 16 ozs.	14 ozs. beer, 62 ozs. water = 76
,, 4–5	162·25	..	,,	69	920	1024·	45·9	30·36	10·53			
,, 5–6	162·25	62–72	,,	74	955	1024·	..	31·13	11·69			
,, 6–7	162·25	62–72	,,	94	1600	1017·5	40·56	32·8	12·			
,, 7–8	161·75	58–72	,,	84	1312	1016·	42·37	26·24	8·39			
,, 8–9	161·5	60–74	,,	74	1188	1018·	45·9	28·5	9·8			
,, 9–10	159·2	60–72	,,	74	1500	1015·5	45·	30·	9·75			
Mean	161·75	..	6 ozs. carniset, 10 ozs. bread	76	1231	..	43·63	30·184	10·227	2·075		
Maximum	162·75	..	..	94	1600	..	45·9	32·8	12·	2·177		
Minimum	159·2	..	..	64	920	..	40·56	26·24	8·39	1·773		

DR. DOUGLAS, æt. 22½. Height, 5 ft. 3 in. Girth, 35 to 37 inches at Nipples (Full Expiration to Full Inspiration) Vital capacity of Lungs, 230 cubic inches.

1st SERIES.—USUAL FOOD.

Date.	Weight on rising on the 2nd day named.	Pulse.	Solid Food in 24 hours, in ozs. avoir.	Liquids in 24 hours, in fluid ounces.	Urine.						Nature of Food.
					Urine of 24 hours in C C.	Specific gravity at 60°.	Solids in grammes.	Urea in grammes.	Cl Na in grammes.	Acidity, grammes of Crystallized Oxalic Acid.	Average amount of daily Food.
Dec. 11–12	...	60–72	39·	50	900	1030·5	59·85	41·4	9·27	2·7	Cooked.
,, 12–13	131·25	...	42·	39	1038	1031·	...	47·85	10·64	3·8	ozs.
,, 13–14	131·	60–68	43·5	64	1070	1031·	70·	50·82	9·63	4·	Meat ... ... 12·98
,, 14–15	131·5	60–72	40·25	38	1020	1032·5	...	45·9	11·22	3·5	Potatoes ... ... 8·13
,, 15–16	131·75	...	45·25	33	906	1033·	66·3	42·8	10·65	3·6	Bread ... ... 15·88
,, 16–17	132·25	60–72	39·	43	910	1032·5	...	43·04	10·	3·7	Butter ... ... 1·93
,, 17–18	132·75	...	43·5	45	1000	1033·	75·7	48·5	9·55	3·77	Cheese ... ... 2·21
,, 18–19	132·75										Beer ... ... 29·7
											Water ... ... 14·8
Mean	132·03	...	41·78	44½	978	1031·9	67·96	45·78	10·137	3·68	
Maximum ...	132·75	...	45·25	64	1070	1033·	75·7	58·82	11·22	4·	
Minimum ...	131·	...	39·	33	900	1030·5	58·85	41·4	9·27	2·7	

2nd SERIES.—CARNISET AND BREAD.

Dec. 18–19	...	60–68	6 ozs. carniset, 10 ozs. bread	55	915	1029·	63·21	39·07	10·9	3·	
,, 19–20	131·25	64–68	,,	40	760	1031·	62·4	34·96	8·17	3·2	
,, 20–21	130·75	...	3 ozs. carniset, 12 ozs. bread	70	1120	1020·	46·6	29·12	8·4	3·3	Carniset and bread. Beer and water.
,, 21–22	127·5	60	6 ozs. carniset, 10 ozs. bread	81	910	1028·	53·4	35·49	6·37	3·3	
,, 22–23	128·75	...	,,	10 5	1300	1018·	57·5	35·1	11·7	2·6	
,, 23–24	128·5	58–68	,,	100	1800	1016·5	56·2	30·6	13·	2·2	
,, 25	127·5										
Mean	129·04	...	5½ ozs. carniset, 10½ ozs. bread	75	1134	1023·7	56·55	34·056	10·09	2·9	62 ozs. of water, 13 ozs. of beer
Maximum ...	131·25	...	,,	105	1800	103·1	63·21	39·07	13·	3·3	
Minimum ...	127·5	...	,,	40	760	1016·5	46·6	29·12	6·37	2·2	

MR. OLIVER, æt. 25. Height, 5 ft. 8½ in. Girth at Nipples, 36½ inches.

1st SERIES.—USUAL DIET.

Date.	Weight on rising on 2nd day named.	Pulse.	Urine.	
			Quantity in C. C.	Urea in grammes.
Jan. 2	140·	60–64		
„ 2–3	139·75	64–66	1920	41·28
„ 3–4	140·	64	1300	46·8
„ 4–5	140·	62–66	2000	35·
„ 5–6	140·	64–66	1580	39·5
„ 6–7	140·25	64–66	1995	39·9
„ 7–8	140·25	64–66	1750	38·5
„ 8–9	140·	64	1750	40·25
„ 9–10	140·25	62–64	1770	45·13
„ 10–11	140·	62	1700	34·
„ 11–12	140·25	62–66	2000	38·
„ 12–13	140·5	..	1405	44·96
Mean ..	140·1	..	1742·7	40·31
Maximum..	140·5	..	2000	46·8
Minimum..	139·75	..	1300	34·

2nd CARNISET SERIES.

Jan. 13–14	140·5	62	1450	26·82	Carniset, 8 ozs., bread, 10 ozs., were taken daily.
„ 14–15	140·	62–64	1050	21·	
„ 15–16	139·75	64	1100	27·5	
„ 16–17	138·75	62–64	1300	23·4	
„ 17–18	137·25	66–68	1730	16·43	
Mean ..	139 25	..	1326	23·03	
Maximum..	140·5	..	1730	26·82	
Minimum..	137·25	..	1050	16·43	

Dr. Flood, æt. 22. Height, 5 ft. 11 in. Girth of Chest at Nipples, 35½ to 38 in. (full Inspiration to full Expiration). Vital capacity, 270 cubic inches.

1st Series.—Usual Diet.

Date.	Weight on rising on the 2nd day named.	Pulse.	Urine.		
			Quantity in C. C.	Urea in grammes.	
1863.					
Jan. 2	150·5	60–80			
,, 2–3	150·25	58–80	1260	32·13	
,, 3–4	150·75	60–80	1360	33·32	
,, 4–5	150·75	60–82	Lost		
,, 5–6	152·	58–82	2025	42·72	
,, 6–7	151·5	60–80	1900	38·	
,, 7–8	151·	60–84	1800	36·	
,, 8–9	150·75	60–88	1900	36·1	
,, 9–10	150·25	60–72	1880	38·54	
,, 10–11	150·	58–66	1800	36·	
,, 11–12	151·	58–64	1380	33·81	
,, 12–13	151·5	..	1610	35·42	
Mean ..	150·85	..	1691	36·2	
Maximum..	152·	..	2025	42·72	
Minimum..	150·	..	1260	32·13	

2nd Series.—Carniset Diet.

Jan. 13–14	149·5	58–60	1450	31·9	8 ozs. carniset, 10 ozs. bread.
,, 14–15	148·5	52–56	2100	28·56	
,, 15–16	148·5	52–56	1320	26·4	
,, 16–17	149·5	56–60	1120	28·0	
,, 17–18	148·25	56	1730	26·81	
Mean ..	148·85	..	1544	28·33	
Maximum..	149·5	..	2100	31·9	
Minimum..	148·25	..	1120	26·4	

REPORT

OF THE

MEDICAL BRANCH FOR 1861.

BY

H. MAPLETON, M.D.,

DEPUTY INSPECTOR-GENERAL OF HOSPITALS.

TO THE DIRECTOR-GENERAL,

ARMY MEDICAL DEPARTMENT.

Sir,

I have the honour to submit the Reports, &c., connected with the Medical Branch of the Army Medical Department, for the year ending 31st December, 1861.

Officers of the Department.

On the 1st of January, 1861, there were 1,033 Medical Officers on full-pay. During the year 22 Assistant Surgeons entered the Service; 15 Medical Officers died; 9 resigned; 8 retired upon permanent half-pay (7 from ill health, 1 from other causes); and 27 were placed upon temporary half-pay, on account of illness.

Medical and Surgical Transactions.

1. Observations on the Influence of Pandemic Causes in the production of Fevers, by Robert Lawson, Esq., Deputy Inspector-General of Hospitals.
2. Observations on Pulmonary Diseases, and their relation to Syphilis, by Dr. David Milroy, 30th Regiment. Also Notice of Pulmonary Lesions associated with Syphilis, contributed by Professor Aitken, Army Medical School, Netley, in further elucidation of the subject of Dr. Milroy's paper.
3. Reports on the Cases of Gunshot and Sabre Wounds of Invalids sent to Fort Pitt, during the year 1860–1 (extracted from the Annual Reports of the Surgical Division), by Thomas Longmore, Esq., Deputy Inspector-General, Professor of Military Surgery.
4. Extracts from the Annual Report and Return of Sick treated in the Lunatic Hospital, Fort Pitt, from the 1st January to the 31st December, 1861, by Dr. Barron, Staff Surgeon.
5. Case of extensive Abscess in both Kidneys, compiled from Official Records, by Dr. Rutherford, Deputy Inspector-General of Hospitals.

6. Case of complete Transfixion of the Abdomen by a Bayonet, by Dr. Todd, Staff Surgeon.
7. Excision of the Knee Joint for Scrofulous Disease of the Bones, and recovery, by Dr. Fox, Staff Surgeon.
8. Abstract of a case of Ununited Fracture, by J. M. S. Fogo, Esq., Surgeon, R.H.A.
9. Report on Fever, by Dr. J. A. Marston, Assistant Surgeon, R.A.

Army Medical School.

The Report of the Fourth Session, which terminated on the 1st April, 1862, will be found at page 525.

Circulars, Memoranda, and General Orders, affecting the administration of the Medical Department of the Army and its Officers, issued during the year, will be found at page 527.

A List of the Officers of the Medical Department will be found at page 535.

I have the honour to be,

Sir,

Your most obedient humble servant,

HENRY MAPLETON, M.D.,
Deputy Inspector-General.

6, *Whitehall Yard,*
31*st March*, 1863.

MEDICAL REPORTS FOR 1861.

OBSERVATIONS

On the Influence of Pandemic Causes in the Production of Fevers.

By Robert Lawson, Esq., Deputy Inspector-General of Hospitals.

The expressions Epidemic, Epidemic Cause, Epidemic Influence, Epidemic Constitution, Pandemic Cause, or Pandemic Influence, occur so frequently in medical writings and discussions, as to show the general belief in the profession that the ordinary climatorial, endemic, and personal causes, are insufficient to account for the variations in the prevalence and fatality of disease; yet, wonderfully little is known as to the nature of the cause in question, its mode of operation, the complaints it induces, or the extent to which its influence is experienced; all of them points on which more extended information is required before the present ideas on the ordinary causes can be rendered more precise.

The advance of knowledge on this subject has been much impeded by the disposition, so strong among medical writers and observers, to regard disease as they individually see it, and to refer its prevalence and character to circumstances affecting, obviously, the population within their immediate sphere; while, had their investigations been extended to other countries a similar prevalence of disease might have been found, under local circumstances, very different from those thought so essential to its occurrence among themselves; thereby indicating the operation of some cause more extensively than they had reckoned.

It is proposed to elucidate this important subject, in connection with Fever, mainly with the assistance of the Statistical Returns of the Sickness and Mortality in the Army, from 1817 to 1836. These afford a continuous record of the progress of disease in bodies of men, small it is true, but pretty constant in number, and under nearly similar circumstances at each place. The stations extend from Ceylon to Jamaica in longitude, and from Great Britain to the Cape of Good Hope in latitude; they present a great variety of climate, and the greatest difference as to the ordinary endemic sources of disease, yet fevers prevail amongst them, presenting periods of increase and decline with much regularity, and which can often be distinguished at them all.

Disease being merely the reaction of the system under the influence of causes subversive of its normal and healthy functions, it is clear that whenever it arises such antecedents must have been in operation, and the previous action of the antecedents may be concluded from the results with as much certainty as in ordinary physical investigations. In etiology, it is true, the supposed causes are often numerous and complicated, and it may not be easy to say which one, or what combination of them, has been efficient in bringing about the result; but the only method of attaining this end is that pursued in physics, viz., eliminating one or more that are essential to a particular conclusion, and observing whether the result continues unchanged, or how far it becomes modified under the altered circumstances. In practice it is seldom allowable, or possible, to carry out this as if it were merely an experiment in physics or chemistry; but, nevertheless, a careful observer will often discover

in the position of those around him such a variety of circumstances as will enable him to make a sound induction. Often, however, after the closest examination, the evidence remains defective in some particular necessary to a satisfactory conclusion, in which case observers cannot be too careful to avoid substituting mere opinion, a practice which has existed, and still exists, far too generally among medical men, and which has checked the progress of medical science enormously.

Individuals, or bodies of men, differ greatly in sensitiveness to the causes of disease, according as they are acclimated or not. Change of station, and, much more, change of climate, subjects them to a modification of the external influences acting on the system; and some time elapses before the resulting modification of its functions is fairly established. While this transition is in progress, should the individuals be subjected to other causes of disease, such as malaria, exposure, fatigue, indifferent food, &c., especially if, during an epidemic period, it is found they are affected in higher proportion, and the mortality among them is much greater than among others who have become acclimated by a longer residence. Our military annals present many illustrations of the danger of sending troops abroad, especially to the tropics, during epidemic seasons; the history of the West Indies teems with them; and, even in temperate climates, military expeditions during such seasons have always been disastrous, such as that to Walcheren in 1809, and that to the East in 1854–5, while others, which have fallen on happier times, have been much less fatal.

It is frequently stated by those who hesitate to admit the operation of an epidemic or pandemic cause, that, were it existing, every locality within its influence should manifest the disease or diseases it is supposed to induce to nearly an equal extent. The answer to this is, that it is not found to be so. On the contrary, in a group of stations under the same general influence, the disease may prevail to a very different extent in each, and attain its maximum in one year at one, and in another at the next station to it, and so on; the persistence of the disease showing the continuance of the general cause, though its local manifestations vary from time to time, owing to peculiarities in the meteorological or local circumstances. As it is important to place this point in the clearest light, the mortality from fevers, mostly remittent or yellow, is given below for three groups of stations, from 1829 to 1831 inclusive, during which fever was very prevalent both in the Mediterranean and West Indies.

TABLE I.—Annual Mortality per 1,000 mean strength, from Fevers, at under mentioned Stations.

Stations.	1826.	1827.	1828.	1829.	1830.	1831.
IONIAN ISLANDS—						
Corfu	9·1	14·0	10·6	11·4	6·0	4·8
Santa Maura ..	19·8	21·4	14·97	76·9	62·2	32·6
Cephalonia ..	9·5	20·6	26·7	14·2	21·2	13·0
Zante	12·4	23·1	8·9	..	30·8	3·4
WEST INDIES—						
Demerara.. ..	64·5	121·6	114·0	38·9	65·2	79·5
Trinidad	55·4	54·4	133·1	13·2	21·6	31·0
Tobago	51·3	15·5	62·9	80·9	125 0	82·4
Grenada	4·0	11·2	90·9	50·2	6·0	3·5
St. Vincent ..	10·0	6·5	9·4	14·0	10·8	10·3
Barbadoes ..	5·7	8·7	5·0	0·8	2·2	2·7
Santa Lucia ..	39·2	210·7	24·7	35·0	33·3	35·2
Dominica.. ..	85·7	20·9	..	26·4	22·6	12·8
Antigua	..	25·4	22·5	3·8	13·4	9·1
JAMAICA—						
Port Royal ..	81·2	151·9	10·7	74·6	144·9	..
Fort Augusta ..	48·6	277·6	77·4	56·8	29·6	64·5
Up Park Camp ..	60·7	216·8	108·3	31·4	78·8	69·5
Stoney Hill ..	4·6	276·7	28·3	7·9	5·8	147·8
Spanish Town ..	171·0	140·2	71·4	43·7	112·9	198·7

The places in the first group in the above Table lie on the west coast of Albania and the Morea. Corfu is about 60 miles north from Santa Maura; Cephalonia and Zante lie to the south of the latter, in the order named, and the three from north to south do not cover more than 70 miles.

The West India group extends from lat. 7° to 17° N., and from long. 57° to 62° W., in the order named. The stations in Jamaica are all on the south of the island; and, from Fort Augusta, the most central, Port Royal is distant 2 miles to the southward, Up Park Camp, 5½ miles to the eastward, Stoney Hill, 8 miles to the northward, and Spanish Town, 8 miles to the westward.

On examining the Table, the mortality from fever at Santa Maura is found to have attained its maximum in 1828, and to have remained high for the next two years. Corfu attained its maximum in 1827, and subsequently declined. Cephalonia had its maximum in 1828, with an abatement in 1829, and a second maximum in 1830; while Zante had maxima in 1827 and 1830, with very little mortality between.

Taking the West Indian group, it shows, as in the Ionian, a high rate of mortality from fever from 1827 to 1830, but differing in each year, and the maxima occur in different years in contiguous islands, without regularity as to geographical position. Thus, at Demerara the mortality was highest in 1827, with but little abatement in 1828. The maximum at Trinidad was in the latter year; at Tobago it went on increasing till 1830; at Grenada the maximum was in 1828; at St. Vincent in 1829; and at Barbadoes and St. Lucia in 1827; at Dominica the mortality was highest in 1826, while at Antigua the maximum was in 1827, and in 1828 the mortality was almost as large.

The stations in the Jamaica group all attained their maximum in 1827, save Spanish Town, in which the mortality in 1826 exceeded that of 1827. The subsequent course, however, was very different; Port Royal had a very low minimum in 1828, from which it increased to a high maximum in 1830, and in 1831 had not a death from fever. Fort Augusta, within two miles of it, retained a high mortality from fever in 1828, had its minimum in 1830, and more than doubled that again in 1831. Up Park Camp had its minimum in 1829, had a second maximum in 1830, and declined somewhat in 1831. Stoney Hill was low in 1829 and 1830, but the mortality there increased very greatly in 1831. Spanish Town had its minimum in 1829 also; there was a great increase in 1830, and in 1831 the deaths were more numerous than in any year in the Table.

Though these facts be conclusive as to all places within the operation of an epidemic constitution not being similarly affected as to time and degree, more striking illustrations still can sometimes be obtained from the course of disease at a single station. Thus, at Newcastle in Jamaica, where the cantonment consists of a series of wooden houses accommodating about 34 men each, and which are erected on the crest of a narrow mountain ridge, from 3,500 to 4,100 feet above the sea, fever prevailed in 1856 from September till December, causing considerable mortality. The cantonment is only about 800 yards in length, and within this space there were four zones, embracing all the huts or tents right across the ridge, in which fever scarcely showed itself, while there are three intermediate zones in which it was both frequent and fatal.* All were exposed to the same epidemic influence; but within half a mile there were no less than four positions of immunity from disease, alternating with three others in which it was both frequent and fatal. Marked limitation of the disease to certain buildings, while those in the vicinity continue exempt, is not unusual in the history of yellow fever.

Facts of this description show that little weight can be attached to the evidence sometimes adduced from epidemic disease not having invaded localities under quarantine. There was no attempt to limit communication at Newcastle in 1856, and yet the prevailing fever confined itself within certain limits. Had the healthy zones alternating with these been placed in rigid quarantine from the commencement, many would have concluded that that had preserved them from attack, whereas the result showed that, with the freest personal communication, fever did not develope itself in them.

* "Observations on Yellow Fever among the Troops at Newcastle, in Jamaica." Brit. and For. Med. Chir. Rev. October, 1849. p. 445, *et seq.*

Though in a group of stations a high mortality may occur at some in one year, and at others in another, yet for the most part the outbreak of sickness is pretty well defined as to season at each, but there is often a striking difference in this respect between stations in the immediate vicinity, and these may retain their individual peculiarities for a long series of years. The following Table, which gives the deaths for each month for the stations in Jamaica already mentioned (except Fort Augusta, for which the requisite details were not available), will show that the general curve of mortality, and the periods of maximum and minimum, are sensibly different at each. The deaths from all diseases are given, it being impossible to separate those for each, but as five-sixths of them were from fever, they will afford a good indication of the activity of the causes of these. To facilitate comparison, the numbers for each month have been calculated on the supposition that 1,000 deaths took place at the station. The Table has not been extended beyond 1820, as subsequent to that year the troops were often removed when disease manifested itself severely at a particular point, and the results would be less trustworthy; but, to the present day, the stations respectively display much the same character.

TABLE II. — Mortality in each Month in 1,000 Deaths from Disease, among the White Troops, at the undermentioned Stations in Jamaica, between 1804 and 1820.

Month Ending	Port Royal, 1807 to 1820 (14 years.)	Spanish Town, 1804 to 1820 (17 years).	Up Park Camp, 1804 to 1820, excluding 1819 (16 yrs.)	Up Park Camp, 1804 to 1820, including 1819 (17 yrs.)	Stoney Hill, 1804 to 1820 (17 years).
January 20th ..	65	94	75	64	110
February „ ..	37	45	37	30	79
March „ ..	75	43	28	22	42
April „ ..	101	45	26	21	21
May „ ..	91	33	32	28	17
June „ ..	90	40	34	30	25
July „ ..	59	71	43	52	32
August „ ..	65	83	80	125	66
September „ ..	120	66	95	127*	91
October „ ..	89	106	156	145	231
November „ ..	112	152	263	227	183
December „ ..	105	222	131	129	103
Year.. ..	1,000	1,000	1,000	1,000	1,000
Total deaths recorded in period	536	995	1,929	2,398	967

It may be well to notice another point in connection with epidemic disease on which there appears considerable misconception, and a want of that conclusive evidence which alone can set it at rest. I allude to the supposed extension of diseases, such as yellow fever or cholera, by personal communication. It is clear that, to settle this question, the experiment should be tried, whether personal communication can propagate the malady, independently of the local causes which many consider give rise to it; but the difficulty is to insure that this has actually been done in any given case. At Newcastle (Jamaica), in 1856, cases of yellow fever, attributable to the low ground, were put into the hospital among the ordinary sick, and, after a while, some of the patients and attendants, who had not been away from Newcastle for months, became affected with the same disease. Now, this evidence proves only that the causes of the disease were sufficiently active at the hospital to induce it. It suggests, it is true, the possibility that the fever might have been propagated by personal

* In consequence of the fever epidemic of 1819, most of the troops were removed from Up Park Camp in August and September, and did not return until December, which gives a considerably different result if 1819 be included.

communication, and, had the evidence stopped there, no doubt this view would have been strenuously maintained. After the sickliness of the hospital became manifest, however, it was cleared, and the inmates removed to one of those healthy zones already mentioned, about 400 feet distant. Here the other patients and attendants ceased to be attacked, though the opportunities for their being so, so far as personal causes were concerned, were, if anything, greater than in the proper hospital building. Under the last-mentioned circumstances, the local causes were removed, the personal remained, and yet the disease no longer affected those subjected to the latter. The only conclusion admissible is, that local causes, and not personal, caused the disease in the locality originally occupied by the sick. There is a great mass of evidence regarding yellow fever from numerous independent sources to the same effect.

Cases arise every now and then, however, which those who entertain the opinion that the disease is communicated from person to person adduce as establishing their position. Every one of those I have examined appears unsatisfactory, inasmuch as the observations were made under circumstances favourable to the operation of a local as well as a personal cause, and they were not varied so as to eliminate the former; or, if repeated, it was again in such a position as to introduce the local element. Observations of this sort may give an apparent support to those preceding them, made under a similar combination of circumstances, but, though repeated to any extent, can never settle the point in dispute. Had the sick at Newcastle been removed to one of the sickly divisions of the cantonment, on the hospital being closed (and it was not known at that time what parts would prove sickly), it is clear that the apparent extension of the disease under circumstances favourable to personal communication would have received a strong support, instead of being contradicted by the result actually obtained.

It is really a matter of extreme difficulty to insure that local causes have not been in operation, for, as there is no certain proof that they exist in sufficient intensity to produce fever, unless persons within their influence be attacked, so, if the disease arise when previous experience shows it is probable such causes may be in operation, it is impossible to determine whether personal or local causes have been most efficient, the occurrence of cases being the only evidence of the effective operation of either, and there being no means, in such a locality, of separating the one cause from the other, and repeating the observation. There are many instances on record, such as those at Newcastle, where the disease did not occur at all in the new position, and these afford both consistant and decided results; but where fresh attacks do occur, if any suspicion attach to the new locality, the difficulty just mentioned arises in all its force, and every case I have seen adduced in support of the propagation of yellow fever from person to person appears open to this objection.

The instances chiefly depended on, of late years, to establish the personal communication of yellow fever, have occurred in ships, mostly steamers. The crews of these, and of sailing vessels which have carried coals to the tropics, are found to be peculiarly liable to yellow fever at certain times. It has been remarked that, as the ordinary emanations from ships' holds, the odour of what is denominated "bilge-water," and which is well known by the quantity of sulphuretted hydrogen it contains, does not produce fever — therefore no fever can be attributed to this source; but those who reason thus forget there may be other emanations besides that from bilge-water, and that in steamers especially, when much under steam, a state of things prevails which soon produces an accumulation of filthy putrescent mud under the engines and boilers; and if these be not separated from the other parts of the hold by water-tight partitions, that mud gradually insinuates itself fore and aft, in spite of every effort to prevent it. In coal ships, the dust finds its way into the spaces between the timbers, and these being covered inside by planking, it cannot be got at or removed, though the emanations from it may be most injurious. It is clear that, with such sources of local emanation on board steamers or sailing vessels, the full influence of which can never be ascertained or allowed for, no proof drawn from them as to the influence of personal communication in propagating yellow fever can be of any weight.

But emanations from the holds of vessels, capable of producing yellow fever, are by no means confined to steamers or coal ships; there are many instances on record of that disease having arisen in other vessels, from sources of impurity

on board them. The last of these I am acquainted with is mentioned by the President of the Epidemiological Society, in his annual address, delivered on the 5th November, 1860 ; and as it is circumstantial, and presents the facts in a manner illustrative of what has been stated above, it is here given entire, to show that these reflections are not mere fancy, but are strictly in accordance with fact :—

"A sailing vessel, the 'Cidade de Belem,' arrived at Lisbon from Para, in Brazil, on the 31st December, 1859, after a passage of thirty-eight days. Yellow fever was prevalent at Para while the 'Cidade de Belem' was there, and eight days previous to her departure from that port, two of her seamen fell victims to this scourge. The crew were in perfect health during the voyage, and on their arrival at Lisbon. On the 2nd January, 1860, or three days after the ship's arrival, the hatches were opened for the purpose of discharging the cargo, when all hands, including a pilot and health-guard officer, both sent on board at Lisbon, were attacked with nausea and other unpleasant symptoms. The cook at once manifested grave symptoms of yellow fever, and he died on the 4th January. The health officer was attacked the next, a seaman on the 6th, and another seaman on the day following. Both seamen died at the lazaretto on the 18th January, and the health guard, after being in extreme danger, recovered."*

The cargo, which consisted of hides and other articles considered "susceptible," was landed and burnt in the Lazaretto. There is no account of any other person connected with the vessel, or employed in handling the cargo, having been attacked.

Here was a clear case of a ship carrying a cause of yellow fever in her hold across the Atlantic, or generating it there during her passage, with sufficient intensity to affect the persons who were exposed to the emanations from it, on the hatches being removed at the port of discharge. There is no question whatever as to personal communication ; the period which had elapsed between the possible exposure of the crew in Brazil, and the outbreak at Lisbon—forty-one days,—is too long for the disease to have remained in them in the incubative stage. Had such emanations been diffused among the crew during the passage, sufficiently concentrated to cause a succession of attacks of fever, a fair show of proof would have been afforded in support of its transmission from person to person, but such proof could not have been admitted as decisive while the impurities of the hold remained ; yet this is the nature of the evidence on which the question of personal communication is sought to be decided against local impurities, in every case with which I am acquainted. In all there may have been personal as well as local causes in operation, but the evidence has not been such as to justify a decision in favour of the personal, to the exclusion of the local, causes.

It may be said that the cargo of the "Cidade de Belem" was impregnated with the fomites of yellow fever, and that the escape of these caused the outbreak on board of her. If so, it is extraordinary that those subsequently engaged removing the cargo were not affected, to some extent, as well as the crew, for it cannot be supposed that the fomites had completely left the substances supposed to harbour them, and were discharged with the first emanations from the hold.

There are plenty of other instances of yellow fever arising from the emanations from foul holds, where there was no question as to fomites, two of which may be noticed here, as they took place in vessels away from yellow-fever localities, and are well authenticated. One was in Her Majesty's ship "Growler," at Woolwich, in 1845, after her return from the coast of Africa ; when the holds were being cleaned, two men who slept directly over the hatchway were seized with fever, possessing all the characteristics of yellow fever, and in the course of a few days they both had black vomit, and died in the Marine Infirmary, where they had been taken at the commencement of the disease.†

The other case is that of the brig "Donostierra," at Passages, in the north of Spain, near St. Sebastian. The "Donostierra" left Havanna in the beginning of June, 1823, with a cargo of coffee, tobacco, yellow wax, honey, and preserves. The crew consisted of twenty-two persons, and there were five passengers. The vessel sailed with a clean bill of health. Ten or twelve days after leaving, one

* "Transactions of the Epidemiological Society," Vol. I, p. 189.

† Bryson, "Report on the Climate and Diseases of the African Station," p. 224.

of the seamen died of an acute disease, which the captain denied having been yellow fever; but whether this disease or not, does not materially affect the subsequent events. After a passage of thirty-five days the vessel arrived at Comana, and in consequence of the death just mentioned, was placed in quarantine for ten days, on the termination of which she was admitted to pratique, and proceeded to St. Ander, where she remained some days, and then went on to Passages, where she arrived on the 2nd August, about two months after leaving Havanna. There had been no sickness among the crew or passengers from the arrival at Comana, and apparently none during the voyage, except the case already mentioned.

The cargo commenced to be discharged on the 6th August, and for several days many people went on board without contracting disease. A custom-house officer was the first attacked; he had slept several nights in the vessel; he sickened on the 15th August, and died on the 17th, of yellow fever. On the 19th, carpenters were employed removing some of the planks of one side, all of whom were soon affected with fever, and most died. Two women, who occupied a house close by the vessel, and had communicated with her, were attacked on the 23rd and 24th, and died. None were affected, however, unless in houses close to the brig, or who had been on board, or remained some time within the range of the emanations from the "Donostierra." Those so attacked, who resided at a distance from the source of the emanations, did not communicate the disease to the persons around them."*

In this case, neither the crew nor cargo can be accused of having conveyed the fomites; the disease did not appear until the vessel was empty; then the emanations from between the timbers became diffused, and affected the custom-house officer who slept on board; and subsequently, on opening the side, those engaged in this operation were the first affected, and afterwards, from the freer outlet afforded, others living in the vicinity, or who came there, caught the disease; but out of their range none were attacked.

The additions to our knowledge of yellow fever, and of fevers generally, within the last half century, should set aside the opinion then held by many, that yellow fever was propagated by personal causes alone; but, on the other hand, as crowding, filth, and insufficient ventilation, whether acting in combination, or singly, are well known to favour the outbreak of epidemic disease, and even to generate a poison capable of exciting at least one form of fever, it is a fair subject of inquiry whether, under favourable circumstances of climate, and the existence of an epidemic constitution, these conditions of themselves, without the assistance of a local cause (in contradistinction to a personal one), could produce the disease. *A priori*, there is no reason obvious why a fever originating in ochletic poisoning, under the favourable circumstances mentioned, should not assume the form of yellow fever, as well as one arising from malarial poisoning; but this can be established only by close and accurate observation. In all cases hitherto brought in evidence, it appears to me the influence of local causes has never been got rid of sufficiently to allow of the personal receiving that weight by which alone a point so long in dispute can be fairly set at rest.

In estimating the prevalence and intensity of the causes of disease at different places, either the number of attacks, or the deaths, may be made use of, or both may be combined; each plan has its advantages, but neither is quite unexceptionable. Twenty per cent. of the strength admitted with fever, for example, in England or Canada, indicates a very different amount and intensity of cause from the same number admitted in the West Indies; and even in the latter, the same percentage of admissions in different islands may indicate very different amounts of activity of the causes of disease, and still more so in different years. The deaths present a better, and more easily comparable series of facts, than the admissions. When a great disposition to slight disease has existed, not leading to marked increase in mortality, they will fail to show it; but when disease has been both more frequent and more severe, or of a more aggravated type, without increased frequency, they will give the best indication of the force of the causes which have been in action. In what follows, therefore, the deaths will be employed for this purpose, and to facilitate comparison, will be given in the form of ratios per 1,000 of mean strength for each year, at the respective stations.

* "La Roche on Yellow Fever," Vol. II, p. 449.

TABLE III.—Millesimal Ratios of Deaths from Intermittent, Remittent, Yellow, and Continued Fevers, each Year, at the undermentioned Stations.

Year.	Canada.	Nova Scotia.	Bermuda.	Gibraltar.	New Orleans, Civil Population.	Jamaica.	West Indies.	Coast of Africa.			St. Helena, Troops and Civil Population.	Cape.	Mauritius.	Ceylon.	Malta.		Ionian Islands.	Home.		
								Navy, all causes.	White Troops.	Officers, all causes.					Troops.	Civil Population.		Dragoon Grds. and Dragoons.	Foot Guards.	Infantry.
1817	3·2	1·8	..	*	24·8	60·9	59·4	..	..	..	*	*	*	29·6	1·6	*	30·3	..	..	..
1818	1·8	..	16·2	5·8	..	71·0	60·9	..	..	..	6·0	..	0·9	133·8	5·6	2·8	14·0	..	..	..
1819	1·7	2·9	229·4	2·5	16·2	273·8	39·0	..	..	36	1·4	2·5	1·2	40·3	3·3	2·8	19·2	..	..	..
1820	0·6	2·0	3·0	3·0	14·7	134·6	78·7	..	..	231	2·3	2·5	0·7	4·4	3·2	2·4	7·0	..	..	..
1821	2·8	..	14·3	3·6	..	94·4	67·1	..	..	103	..	..	1·5	10·8	1·0	1·9	24·7	..	..	..
1822	1·3	1·9	3·1	2·2	25·5	154·6	47·0	..	..	63	..	2·2	..	28·7	6·2	2·6	13·5	..	..	..
1823	3·4	2·0	13·9	0·7	..	52·7	23·0	..	..	302	..	1·5	0·8	20·0	1·5	3·3	19·0	..	..	..
1824	2·3	0·5	14·2	5·3	3·0	67·4	43·2	..	..	639	..	3·0	0·8	104·9	7·0	2·4	18·7	..	..	..
1825	4·3	1·8	3·7	3·2	2·8	287·8	38·5	61·8	679·5	275	†	6·7	0·9	27·6	2·3	2·4	8·3	..	..	..
1826	3·2	0·9	1·6	4·2	..	69·6	30·3	54·7	632·7	400	2·2	0·8	3·0	3·2	2·4	1·6	11·0	..	..	..
1827	4·6	2·7	4·5	1·9	2·5	213·6	52·2	41·9	98·6	233	2·2	4·2	0·6	12·4	2·3	1·7	16·0	..	..	..
1828	3·2	0·5	..	121·1	2·9	64·3	49·0	84·6	25·9	89	..	5·2	7·3	9·3	3·3	1·7	20·8	..	..	..
1829	1·6	2·6	..	1·1	18·9	40·6	21·1	255·1	70·2	161	..	..	1·2	3·9	0·4	1·7	13·4	..	..	..
1830	1·6	0·4	..	1·4	2·4	77·4	28·5	107·9	..	125	..	0·9	3·1	5·0	2·6	1·6	13·3	0·9	1·8	2·0
1831	1·6	6·5	2·5	3·2	..	106·6	30·5	28·0	..	..	0·7	1·7	..	4·6	3·4	1·6	7·7	2·5	1·7	5·0
1832	2·9	0·9	..	2·5	7·3	91·3	10·8	35·2	..	..	0·9	0·9	1·7	8·3	1·0	1·8	1·8	0·8	1·2	3·1
1833	0·8	1·1	2·6	0·7	17·7	61·1	13·3	21·4	..	87	0·9	..	2·7	2·5	1·9	2·1	5·5	0·9	2·0	3·5
1834	2·4	1·5	1·4	1·3	1·6	56·4	10·0	29·0	..	136	..	..	2·8	2·9	6·4	3·2	6·1	0·6	2·3	0·9
1835	2·4	0·9	..	0·3	4·5	54·8	22·2	23·3	..	..	1·8	3·4	..	11·0	0·5	..	3·1	2·2	0·7	1·7
1836	2·4	0·5	1·5	1·9	..	39·9	34·1	16·6	..	45	..	1·3	2·5	4·3	2·3	..	3·6	1·5	2·1	4·4

* No return.

† Civil population.

This Table contains the mortality from fevers of every description among the troops. In Canada, Nova Scotia, Bermuda, Gibraltar, Malta, Cape Town, Mauritius, and the home stations, the form of the disease was almost exclusively continued, with yellow fever at Bermuda, in 1819, and at Gibraltar, in 1828. In the Ionian Islands, the remittent was by far the most fatal form. In Ceylon, the mortality was caused by the remittent form; and in the West Indies, Jamaica, and the Coast of Africa, either by the periodic forms, or yellow fever. The mortality from yellow fever among the population of New Orleans is from Barton.* In addition to the deaths from the yellow form of the disease, however, it would appear, from a Table given by the same author (p. 271), that from 1849 to 1853 a yearly mortality from other forms of fever—4 to 6 per 1,000 of population—occurred; but as it was impossible to obtain this for previous years, the rate for yellow fever alone has been given above. The deaths among the civil population of Malta, from fever, are from data in the Statistical Reports on the Health of the Army†; it will be seen that these, embracing, as they do, persons under different circumstances as to age, social position, exposure, and acclimatization, from the troops, do not present an exact correspondence in the increase or diminution of mortality with them, though in the main they agree pretty well. The deaths in the squadron on the Coast of Africa are from the "Report on the Climate and Diseases on the African Station," p. 177. These, as well as the deaths among the military officers on the Coast of Africa, embrace those from all diseases; of the former, it is estimated that all above 20 per 1,000 of mean strength are from fever‡, and as 77 per cent. of the latter were from fever also§, (though they cannot be separated for each year), a pretty close estimate may be formed from them of the progress of that form of disease among each class. The rates of mortality from fevers is given for the English troops at St. Helena, from 1818 to 1821 inclusive; and for the civil population, that for 1826-7, and 1831 to 1835 inclusive. This information is less complete than is desirable, but more extended and precise data were not available.

In extended commands, such as the West Indies, Canada, Ionian Islands, and Ceylon, which embrace several subordinate stations, at all of which the maximum or minimum of mortality may not occur in the same year, the aggregate, as given in the Tables, may present neither the sudden increase nor decrease seen at others where the troops were closer together, as at Malta, Gibraltar, or Bermuda. At the latter, too, excessive or very low rates of mortality are more confined to single years, while in the former these are usually more diffused. A large mass of civil population resembles the more extensive military commands in these respects, as may be seen by comparing the deaths among the troops and civil population at Malta.

On examining Table III, it is found that the mortality from fevers undergoes great fluctuations at the same station in different years, and that these fluctuations can be traced through many stations in the same year, or in those immediately preceding or following it, with extraordinary regularity.

Taking Jamaica, the locality of all others in the Table remarkable for its enormous and sustained death rate, the first considerable remission in mortality is found in 1823, when it stood at 52·7 per 1,000 of strength; the next is in 1829, when it fell to 40·6 per 1,000; and the last occurs in 1836, when it was 39·9. Coincident with the first, very low ratios are found in the West India station, at Gibraltar and Malta; with the second, in the West Indies, Gibraltar, Malta, and Ceylon. The last period, embracing 1830-36, displayed a much less intensity of fever at all the stations in the Table, and the fluctuations of mortality are less marked than in the former two. Each will form a convenient subdivision for more extended examination.

There were, unfortunately, no returns for several of the stations in 1817, and the information for that year in Table III is incomplete. It may be observed, however, that there was a high rate of mortality from fever in the

* "Cause and Prevention of Yellow Fever," p. 100; Chart and Comparative Table following Introduction.

† "Statistical Report on the Health of the Troops serving in the Mediterranean," p. 69, *et seq.*, 1839.

‡ "Climate and Diseases of African Stations," p. 178.

§ "Statistical Reports, Western Africa," p. 24.

Ionian Islands, New Orleans, and Canada, with a moderate one in Ceylon, Malta, and Nova Scotia, while at Bermuda there was none. In the West Indies there was a high mortality this year, and in Jamaica an equally great one, though, when compared with the subsequent ratios for that island, it must be regarded as low.

In 1818 the mortality in the Ionian Islands and Canada fell about one half, and in Nova Scotia and New Orleans there were no deaths from fever. In Ceylon, Malta, and Gibraltar, there was a great increase; in the West Indies the previous year's rate was maintained, while Jamaica and Bermuda both had large accessions. Of the stations south of the line, St. Helena had a high rate of mortality from fever among the white troops, and Mauritius, in nearly the same latitude, a moderate one; while the Cape, intermediate between them in longitude, but more southerly in latitude, had none.* These facts show that the influence which led to such high rates of mortality in 1817, in the Ionian Islands, New Orleans, and Canada, was passing off, while another, apparent in the West Indies in 1817, was this year still in operation there, and at St. Helena, and had become highly developed in Ceylon, Malta, and Gibraltar, and was becoming apparent in Jamaica and Bermuda.

In 1819 the death-rate in Ceylon was not more than a third of that of the previous year; it was also much diminished in Malta, Gibraltar, and the West Indies, but it was higher in the Ionian Islands, enormously increased in Jamaica and Bermuda, and there were also high rates at New Orleans and Nova Scotia, the previous year's rate in Canada being maintained. St. Helena had a ratio only one-fourth of that of 1818, and the officers on the Coast of Africa were also healthy, while at the Cape there was a considerable mortality for that station, and at Mauritius a moderate increase. Thus the influence which in 1818 had led to such mortality from fever in Ceylon, St. Helena, Malta, Gibraltar, and the West Indies, was this year passing away to the northward, as indicated by the increased ratios in the Ionian Islands, Jamaica, Bermuda, Nova Scotia, and New Orleans; while the mortality at the Cape, after the freedom from it in the previous year, indicates the advent of a fresh influence there, the progress of which will be traced below.

In 1820 the rate of 1819 continued at the Cape; there was an increase at St. Helena, on the Coast of Africa, and in the West Indies it was very considerable; the previous rates at Malta and Gibraltar were maintained, or slightly increased; those at Jamaica, New Orleans, and Nova Scotia were reduced, but all still high; while at Mauritius, Ceylon, the Ionian Islands, and Bermuda there were great reductions. The influence which appeared at the Cape in 1819 was then apparent this year at St. Helena, the Coast of Africa, and the West Indies, and partially, perhaps, at Gibraltar and Malta, while that which had preceded it was decreasing at Jamaica, Bermuda, and the American stations. Mauritius and Ceylon were little implicated.

In 1821 the Cape and St. Helena were without any death from fever; those on the Coast of Africa were less than a-half of the previous rate, and there was a diminution in the West Indies, though the rate remained high; there was an increase at Mauritius and Ceylon, also in the Ionian Islands, Gibraltar, Bermuda, and Canada, while at Malta the mortality was less both among the troops and civil population. There was a diminution in Jamaica, and no death at New Orleans or Nova Scotia. These facts indicate that the influence which in 1820 was still strongly felt at Jamaica, New Orleans, and Nova Scotia, had this year passed on from there, but was still experienced in Canada; and that that which, in 1819, had manifested itself at the Cape, had now passed to the northward, was becoming weaker on the Coast of Africa and West Indies, but had become apparent at Bermuda, Gibraltar, and the Ionian Islands. There was an increase at Mauritius this year, with a moderate one at Ceylon: this would appear to be unconnected with that influence which has been traced as far as the Ionian Islands, following closely upon it, but extending less to the westward.

In 1822 there was again a considerable mortality at the Cape; there is no

* It must be remembered that, as sickness usually occurs as the summer heats decline, the mortality in the southern hemisphere, in any given year, precedes that in the northern by about six months.

record this year for St. Helena. On the coast of Africa the rate was low; in the West Indies considerably reduced; in Jamaica, at New Orleans, and Nova Scotia the death-rate was much increased, while at Gibraltar and Bermuda, and in Canada, there was a great reduction. Mauritius this year had no death from fever, but Ceylon and Malta had higher rates; while in the Ionian Islands that of the previous year was much reduced. The influence there, which in 1821 was in full operation in Canada, was much diminished in 1822, while the following one, which was traced from the Coast of Africa, through the West Indies, to Gibraltar and Bermuda in the former year, had passed away from the Coast of Africa, and was now diminishing at the others, but was in full force in Jamaica, New Orleans, and Nova Scotia. The diminished mortality in the Ionian Islands indicates the cessation of the influence experienced there the previous year; while the absence of mortality at Mauritius, with the increase both at Ceylon and Malta, show the progress to the northward of that noticed last year in connection with the former two stations.

In 1823 the mortality at the Cape underwent little change, but that on the Coast of Africa was much increased. In the West Indies, Jamaica, and Gibraltar, the rates were the lowest since 1817, and at New Orleans there was not a death from yellow fever. At Nova Scotia the rate for the preceding year was maintained, while Bermuda and Canada both had a considerable increase. There was thus one influence approaching from the southward, and another still lingering to the northward, while from Gibraltar to New Orleans, including the West Indies and Jamaica, there was less fever than for years before. To the eastward of the Cape, Mauritius had a slight death rate, that in Ceylon was less; it was also less among the troops in Malta, though it continued high among the civil population, and in the Ionian Islands there was also a considerable increase. That influence, therefore, which was perceptible at Mauritius and Ceylon in 1821, was now diminishing, both at Ceylon and Malta, among the troops, but was operating more strongly in the Ionian Islands.

The facts detailed above, showing the regularity and progression of the oscillations of febrile disease at so many points on the earth's surface, far removed from each other, and embracing the continued, remittent, and yellow forms of the disease, leave no doubt as to the operation of some cause equally extensively. There seem to be a series of waves, generated in southern latitudes, which flow to the north or north-westward in succession, leading to an increase of fever at every point over which they pass; and, in some instances, these are so close, that Canada is under the influence of one, the West Indies of the following one, and a third is apparent at the Cape. The atmospheric vicissitudes, or local influences, to which epidemics are so often referred, confined as they are to limited tracts, are quite insufficient to account for such widely-spread effects, though, when the general cause is operating, these local causes are found most influential in generating disease within their sphere of action. A cause, extending over continents and seas as this does, is more correctly designated "Pandemic" than "Epidemic," and as the latter term has come to be applied to every local outbreak, and very often without any attempt to distinguish between an epidemic and a mere increase in the ordinary endemic diseases of the place, it would be well were "Pandemic" to come into use, to indicate that more general influence to which all the others are subordinate. In what follows, the expression "Pandemic Wave" will be employed in the sense here indicated.

The existence and progress of the pandemic wave has been deduced mostly from the records of military stations; but striking evidence of its passage is derived from the outbreaks of disease in the various civil populations within its influence, of which a few instances may be given, as regards febrile diseases, to fill up the sketch. Thus petechial typhus was rife at Naples in 1817, and a disease denominated malignant typhus prevailed at Algiers the same year. In 1818–19 plague ravaged Morocco and the northern coast of Africa, and in 1819–20 it prevailed at Constantinople. Yellow fever prevailed in the south of Spain with varying intensity from 1819 to 1821. There was great mortality from typhus in Ireland in 1817–18–19, and again in 1822. Fever was also very common both in England and Scotland during the former period.

The admissions from continued fevers at the Fever Hospitals of London,

Cork, and Dublin, and the Royal Infirmaries of Glasgow and Edinburgh, were :—*

Year.	London.	Cork.	Dublin.	Glasgow.	Edinburgh.
In 1816 ..	..	..	..	..	105
1817 ..	760	3,440	6,542	714	485
1818 ..	599	6,052	25,502	2,336	1,546
1819 ..	524	2,398	3,873	1,594	1,088
1820 ..	437	1,117	2,994	289	638
1821 ..	232	1,047	2,976	234	327
1822 ..	246	1,159	2,300	229	355
1823 ..	283	1,596	2,668	269	102

From these it is obvious that the pandemic wave which was still sensible in the Ionian Islands and Canada in 1817, overspread the British Isles in 1817–18–19; and it will be observed that London and Cork were, comparatively speaking, affected to a greater extent in 1817 than Dublin, Glasgow, or Edinburgh; all except London had their greatest sickness in 1818, but the Scotch stations carried more of this into the following year than the Irish. The wave described previously as having passed over the Mediterranean in 1818–19 was experienced much more slightly; it seems to have kept up the admissions in London during 1819–20; in Dublin, in 1820–21; and in Edinburgh till 1822. The wave which was at the Ionian Islands in 1821 was sensible in London and Cork in 1822, and in Dublin and Glasgow in 1823. This was followed by that which was at the Ionian Islands in 1823, so closely, that fevers increased in numbers for several years, as will be shown below.

Even in Iceland, 1819 was a very sickly year; a fever denominated "bilious" having prevailed extensively. This was followed in 1820–21 by a "catarrhal fever†." In 1817 yellow fever was common in the Southern States of America; there were outbreaks also in 1819–20; and in 1822 it extended as far north as New York, and even Boston. The coincidence of all these with the passage of the pandemic waves already described is obvious.

The Island of Ascension occupies rather an important position in the history of yellow fever, from the supposed importation of the disease by His Majesty's ship "Bann," in 1823. The island lies nearly 1,000 miles south of Sierra Leone, in the middle of the Atlantic, and is little else than a mass of volcanic ashes. The following numbers of its small garrison appear to have been placed on the sick list for fever, in each period mentioned :—

	Admitted.	Died.
Year ending October 7, 1816	4	..
„ „ 6, 1817	2	..
„ „ 6, 1818	12	1
Period ending September 18, 1819	2	1
From November 26, 1821, to May 7, 1823 ..	3	..

On the 11th May, 1823, yellow fever broke out, soon after the arrival of the "Bann." This, in about two months, carried off 15 out of 35 officers and men, and 6 out of 17 women and children residing on the island.‡ The fatal case in 1818 presented the characters of yellow fever.§

It has been shown above, that in 1818 St. Helena, which lies 700 miles to the south-east of Ascension, was under the influence of a pandemic wave, the operation of which was also distinguishable in the West Indies and Mediter-

* The numbers in this and the subsequent Tables for the same places are taken from "Murchison's Treatise on Fevers," p. 37. The admissions for Edinburgh for 1816 are from Dr. Christison's original paper.

† Brit. and For. Med. Chir. Rev., Vol. V. p. 464.

‡ Burnett, "Report on the Fever in His Majesty's Ship 'Bann,'" p. 67–9.

§ Ibid. p. 74.

ranean; and the returns for Ascension show its influence to have been experienced there in a greatly increased number of febrile cases, and in the occurrence of a fatal case of the yellow form of the disease. It has been shown, also, that a pandemic wave which appeared at the Cape in 1822, continued in operation there in 1823, but had then extended to the Coast of Africa as well, and consequently embraced Ascension, as on the previous occasion. Under these circumstances the "Bann" arrived, at the commencement of the season which had proved unhealthy in 1818, and which, with a pandemic cause in operation, was that at which disease might have been expected to show itself.* Fever did break out, and the analogy of the occurrences in 1818 (when there was no question of importation to complicate them), is in favour of this having done so in virtue of the action of local causes, under the influence of the pandemic wave.

The circumstances attending the appearance of yellow fever at Ascension, in 1838, a period when there was a strong pandemic cause in operation, not only along the Coast of Africa, but also in the West Indies, are to the same effect. On the 16th and 17th March of that year there were heavy rains at Ascension, which penetrated the houses, leaving a large quantity of mud in several, and formed pools among them. The disease broke out in the end of March, as these dried up. The subject of the first case slept in a room under the surface level of the ground, into which muddy water had found its way during the rains, and the ventilation being bad, some time necessarily elapsed before it could be dried. Vessels had arrived from the Coast of Africa with the disease on board, before it appeared on shore; but it is admitted that the first case was not in a position to have been exposed to personal causes from the vessels,† which throws us back on the local causes to account for the production of the disease.

As it appears from the details given above, that in different countries different forms of fever prevailed, under the same general influence, it must be admitted that the pandemic cause determines the frequency and severity, rather than the particular form of the fever, which, there are many reasons to conclude, is more intimately connected with the local circumstances at the time. As bearing on the possibility of yellow fever originating at Ascension, it may be mentioned that at St. Helena a case was returned as this disease in 1819, another in 1820, and a third in 1821; there are no details of these, it is true, but the Medical Officers who reported them must have had a strong impression as to their nature, or they would not have given the name of a disease which was not supposed to exist in that island. These cases presented themselves, and were recorded before the "Bann's" arrival at Ascension; there is no question as to importation, and as they are in accordance with what has been observed frequently elsewhere, of sporadic cases of yellow fever appearing under favourable circumstances, the evidence they afford seems trustworthy.

A distinction as to causation is frequently attempted to be drawn between sporadic cases and those which occur in greater numbers, but without good ground for the opinion. If one case of yellow fever arise in a given situation, it must be admitted that there was a sufficient cause for the disease; the cause may have been slight, and the subject particularly susceptible, still, the nature of the cause must have been such, that if more intense, and more extensively applied, a greater number would have been attacked. It is characteristic of a pandemic wave, that, during its passage, local causes, which under ordinary circumstances seem to exercise inconsiderable influence over the health of those exposed to them, then display a potency, which, if regarded without due weight being given to the reigning pandemic influence, seems quite unaccountable.

Proceeding now to the period 1824–29, it will be seen by Table III., that the mortality in Ceylon was five times greater than in 1823, and the rates at Malta, Gibraltar, and in the West Indies, were much increased, while those in the Ionian Islands and Bermuda were maintained. As in 1818 there was a slight increase in Jamaica, and a low rate at New Orleans, but the ratios of 1823, in Nova Scotia and Canada, were much reduced. There was an augmented ratio at the Cape; that at Mauritius was unaltered, but on the Coast of Africa

* Burnett, "Report on the Fever in His Majesty's ship 'Bann,'" pp. 7–10.

† "Climate and Diseases of the African Station," p. 193.

the deaths among the officers were greatly increased, from the exposure and privations they underwent at this time, in consequence of the Ashantee war. In 1824, then, as in previous instances, the pandemic wave which appeared at the Cape in 1822, and had reached the Coast of Africa in 1823, now embraced Ceylon, the Mediterranean stations, the West Indies, and Bermuda, and was perceptible at Jamaica and New Orleans; and that which was still in full operation in Nova Scotia and Canada in 1823, was now disappearing, while a fresh one seemed to have reached the Cape.

In 1825 the returns for the white troops at Sierra Leone and the Gambia become available, as well as those for the squadron employed on the coast. The Ashantee war had terminated, and the mortality among the officers, though still very high, was not a half of that of 1824. The troops were mostly commuted punishment men from England; they were extremely dissipated, insubordinate, and unmanageable; in addition, they were crowded into barracks in unhealthy situations, and which did not afford protection from the weather, and were fed almost exclusively on salt provisions, circumstances which, combined with the passage of a pandemic wave, led to the enormous mortality in the Table. This year the rates at the Cape increased to more than twice that of 1824; those among the officers, troops, and squadron, on the Coast of Africa, were all high; there was a slight reduction in the West Indies; Ceylon, the Ionian Islands, Malta, Gibraltar, and Bermuda, were all considerably lower; Jamaica had an outbreak exceeding that of 1819 in severity; New Orleans had its previous rate, and Nova Scotia and Canada had them considerably increased. From these facts it is clear that the wave which in 1824 embraced Ceylon, the Mediterranean stations, Bermuda, and the West Indies, was less active at all these in 1825, but had then included Jamaica, New Orleans, and Nova Scotia and Canada within its range. This wave was closely followed by that which appeared at the Cape in 1824, which was still in full operation there, and had extended to Sierra Leone.

In 1826 the ratio of deaths from fever at the Cape fell to an eighth of that of the previous year; that at Mauritius was much greater, but in Ceylon much less; the ratio among the officers on the Coast of Africa was much increased; that among the troops still very high, and in the squadron not materially less; among the civil population in St. Helena the ratio was high as compared with those for subsequent years; there was a slight reduction in the West Indies, a very great one in Jamaica, no death from yellow fever at New Orleans. The Ionian Islands and Gibraltar had both an increase, Malta remained much as the previous year, and Bermuda, Nova Scotia, and Canada were all lower. The pandemic wave under which Jamaica, New Orleans, and the American stations were suffering in 1825, was thus passing off this year, while the action of that already noticed at the Cape had ceased there, but was more developed on the Coast of Africa, at St. Helena, and Mauritius.

In 1827 another wave manifested itself at the Cape by a great increase of mortality; the previous rate was maintained at St. Helena, but all varieties of force on the Coast of Africa, as well as Mauritius, show diminished rates; there was a great increase in the West Indies, and one of those tremendous outbreaks in Jamaica it seems so subject to: there were also increased ratios in Ceylon, the Ionian Islands, Bermuda, New Orleans, Nova Scotia, and Canada, while Malta remained the same, and Gibraltar had a considerable reduction. The wave seemed to have passed away from Mauritius and the Coast of Africa this year, but to have embraced Ceylon, the Mediterranean stations, the West Indies, Jamaica, New Orleans, Bermuda, Nova Scotia, and Canada, though as yet Malta and Gibraltar seemed little affected by it.

In 1828 the death rate at the Cape was greater even than in 1827, and a very high one at Mauritius; the squadron on the Coast of Africa had its previous ratio doubled, but the troops at Sierra Leone, having been removed at the commencement of the year to substantial, airy barracks on Tower hill, and fresh provisions substituted for the previous salt rations, the mortality among them, as well as the officers, was much less. The ratio in the West Indies was somewhat less, and that in Jamaica not one-third of the previous one; at New Orleans there was a slightly increased rate, while at Bermuda, in Nova Scotia, and Canada, they were all reduced. The mortality in the Ionian Islands was higher, at Malta also there was an increase, and at Gibraltar a very severe out-

break of yellow fever. The occurrences in 1827-28 differed from those in 1818-19 and 1824-25 in Ceylon suffering much less than in the earlier periods, and in the greatest sickness in Jamaica taking place the same year as in Ceylon and the West Indies, while that in the Mediterranean was experienced the following one. The continued high rate of mortality in the West Indies, however, in 1828, shows the persistence of the pandemic wave experienced there in 1827, and connects it with that in operation in the Mediterranean in 1828. The pandemic wave which appeared at the Cape in 1827 was still operating there, and had embraced Mauritius on the one hand, and was beginning to be felt on the Coast of Africa on the other.

In 1829 there was no death from fever at the Cape; the rates among the officers, troops, and squadron on the coast, were all much increased, while those in Mauritius, Ceylon, Malta, Gibraltar, West Indies, and Jamaica were all low. There was still a high ratio in the Ionian Islands, as well as a severe outbreak at New Orleans, and a high ratio at Nova Scotia, though in Canada it was diminished. This and the following year no deaths were returned at Bermuda from fever, but several from apoplexy; whether these were fever with head symptoms there is no means of ascertaining. Here, as in previous instances, the pandemic wave, which approached the Cape in 1827, had passed that, and was in full force on the Coast of Africa; while the West Indies, and other stations to the northward, except Nova Scotia, were comparatively free from fever. The severe outbreak at New Orleans in 1829 was unusual, though it may have been connected with that in Nova Scotia as in 1827.

Thus between 1823 and 1829, as in the previous period, there was a series of pandemic waves, first apparent at the Cape, from which they passed on to the northward in succession with remarkable regularity. A few notices of remarkable outbreaks of febrile disease in other places are subjoined, and it will be seen that they all coincided with the passage, at each, of some of the waves already described.

In 1824 the first Burmese War commenced, and troops were sent to various points of that territory, who suffered much from fever in this and the following year. Those at Rangoon were affected early in 1824 with the "Duegur," or what has been called the "Dandy fever." This form of the disease appeared at Calcutta at the same time; the following year it appeared at Burhampore and places in the vicinity. Plague broke out at Cairo in 1824, and carried off 30,000 persons; the following year it prevailed in Lower Egypt. It was rife at Constantinople in 1826, and in 1827 reached Odessa. In 1828-29 plague was very common in Egypt, Syria, Greece, and Turkey in Europe, and affected the Russian troops in the Danubian Provinces, and in the neighbourhood of Adrianople extensively. Petechial fever prevailed at Naples in 1828. In 1827 remittents of a very aggravated type were common in the fenny districts in the South of England. In Scotland fever was common in several of these years.

The admissions from fever at the hospitals already mentioned in Great Britain and Ireland were:—

Year.	London.	Cork.	Dublin.	Glasgow.	Edinburgh.
In 1824 ..	444	1,405	4,679	523	177
1825 ..	503	2,809	4,353	897	341
1826 ..	582	4,341	10,612	926	450
1827 ..	611	4,312	6,500	1,084	1,875
1828 ..	534	1,381	2,964	1,511	2,013
1829 ..	472	838	3,170	865	771

It was stated above that the wave embracing the Ionian Islands in 1821 was sensible at London and Cork in 1822, and at Dublin and Glasgow in 1823, and that this was followed by that found at the Ionian Islands in 1823-4, so closely that sickness increased for several years, attaining its maximum in London and Ireland in 1826-7, but in Scotland, as before, a year later, when the stations to the southward were again healthier. In Iceland typhus, with some other forms of epidemic disease, prevailed in 1828-29, a year later again than in Scotland. Remittents, equalling those of the tropics in violence and

unmanageableness, were common in the marshy districts in the south of England in 1827. The pandemic wave, so severely felt in the Mediterranean in 1828, does not seem to have developed much disease in this country.

In the West Indies the Dandy fever appeared at St. Thomas in 1827; it extended westward, and reached New Orleans in 1828, and was experienced over the Southern States of America, and even as far as New York, in the course of that year. Cases of the same disease are said to have occurred in 1828 at Paris *

From 1828 to 1830 iron bedsteads were introduced pretty generally in barracks, where previously the men had either standing wooden bunks placed round the room, as in a transport, or hammocks to sleep in. This alteration was very important, as it ensured each man a much greater cubic space than before, nearly doubling it in many cases, and, by having the framework of the bedstead open, with bedding of a loose material over it, the cutaneous transpiration of that part of the body in contact with the bed had a freer means of escape than when the person was lying on close boarding. This was of less consequence in cold climates and seasons; but in the West Indies, where the men frequently preferred lying on the floor, partially dressed, to using their hammocks, and on getting up in the morning left the figure of their bodies on the floor from condensed cutaneous transpiration, and of course had that part of their dress next it quite saturated, it was of much more importance. In Ceylon the other extreme had been followed: prior to 1832, European troops there had only a stretcher, with a bottom of open cane-work, without bedding beyond a thin cotton coverlet. A mattrass of cocoa-nut fibre was added that year. In the Ionian Islands the barrack accommodation, which had been very much complained of, began to undergo improvement about the same time. It will be seen from Table III that the mortality from fever was less in all these stations, between 1830 and 1836, than previously; the period, on the whole, seems to have been remarkable for a comparative inactivity of the causes of febrile disease; but the alterations in the accommodation of the troops were no doubt influential in reducing their death-rate lower than it would have been had these improvements not been made.

In 1830 there was a small mortality from fever at the Cape; the white troops had been removed from the West Coast of Africa, but the mortality among the officers, and in the squadron, was less than in 1829, though still high. There was a considerable increase both in the West Indies and Jamaica, but the mortality was much reduced at New Orleans. This year there was a considerable increase at Mauritius, with a slight one in Ceylon. The Ionian Islands maintained their previous year's rate; at Malta there was a considerable increase, at Gibraltar a slight one; the ratios in Nova Scotia and Canada were low. From these it is clear that the pandemic wave which, in 1829, was in full force on the Coast of Africa, was this year diminishing there, but had embraced the West Indies and Jamaica, and was also perceptible in Ceylon and in Malta; Gibraltar, with the American stations, were pretty healthy. The returns of the troops in England were available this year; these show a moderate ratio among the Cavalry, but those in the Foot Guards and Infantry were higher.

In 1831 the ratio of deaths at the Cape doubled; there was a low one at St. Helena among the civil population; no death among the officers on the Coast of Africa, and a very low rate in the squadron. In the East Indies and Jamaica the ratios were higher—in the latter much so; in New Orleans there was no death, nor at Mauritius; Ceylon had nearly its former rate; in the Ionian Islands it fell to nearly a half; while Malta, Gibraltar, Bermuda, and Nova Scotia, and the Cavalry and Infantry on the home stations, had all a decided increase. The pandemic wave had therefore disappeared from the Coast of Africa, but was experienced more severely in the West Indies and Jamaica, and now embraced Malta, Gibraltar, Bermuda, Nova Scotia, and the home stations. Ceylon seemed little affected by it; and the mortality in the Ionian Islands diminished so rapidly at the time, probably for the reasons already specified, that no satisfactory deduction can be drawn from the cause of fever there.

* "Bascome on Epidemics," p. 157.

In 1832 the ratio of deaths at the Cape fell a half; there was a slight increase at St. Helena; no death among the officers on the Coast of Africa, but an increase in those in the squadron. The ratio in the West Indies was much reduced, and that in Jamaica falling; but at New Orleans there was a considerable mortality from yellow fever, which probably would have been much higher, but for a severe outbreak of cholera there this year. Mauritius had a considerable mortality in 1832, and Ceylon had its rate nearly doubled. The Ionian Islands, Malta, Gibraltar, Nova Scotia, and the home stations, had all diminished rates; at Bermuda there was no death, but Canada had its ratio increased. The disposition to febrile disease was much less from 1830, for some years, than previously, as has been already noticed, and the mortality at different stations marks the passage of the pandemic wave less distinctly; but, nevertheless, it can be distinguished at St. Helena, and in the squadron on the coast, on one hand, and at Mauritius and Ceylon on the other; and while the West Indies, Mediterranean, and home stations, Bermuda, and Nova Scotia, were all healthier, Jamaica, New Orleans, and Canada were still under the influence of the preceding one.

In 1833 there was no death at the Cape; the rate at St. Helena was the same as in 1832; there was a considerable ratio among the officers on the coast, though that in the squadron was less; there was an increase in the West Indies, and though in Jamaica the rate continued to fall, that at New Orleans rose materially, but, this year, was accompanied by very little cholera. There was a higher rate in Mauritius, but a lower in Ceylon. The Ionian Islands, Malta, Bermuda, and the Foot Guards and Infantry at home, had all increased rates, while Gibraltar, Nova Scotia, and Canada were diminished. These facts show that the wave which was perceptible on the Coast of Africa and Ceylon in 1832, this year extended to the West Indies, Bermuda, the Mediterranean, and home stations, and was likely concerned in causing the great increase in fever at New Orleans.

In 1834 there was no death at the Cape, nor St. Helena, but an increased rate both among the officers, and in the squadron on the Coast of Africa. The ratios in the West Indies and Jamaica were rather less, and at New Orleans much less; Mauritius and Ceylon maintained nearly the same rates as in 1833. Both troops and civil population in Malta were largely increased; the Ionian Islands, Gibraltar, Nova Scotia, and Canada, had all higher rates; while Bermuda and the home stations had a diminished one, except in the Foot Guards. From these circumstances it appears that the wave perceptible in the Mediterranean in 1833 acquired greater force there this year, and extended to Nova Scotia and Canada, and continued among the Foot Guards at home, while the West Indies, Jamaica, New Orleans, and Bermuda, were all healthier. Though there was no death at the Cape in 1833 or 1834, yet another wave seemed to have passed to the northwards, as indicated by the higher rates at Mauritius and on the Coast of Africa this year.

In 1835 there was again a considerable mortality at the Cape and St. Helena, but no death among the officers on the coast, and a reduced rate in the squadron. The ratio in the West Indies was doubled; that at Jamaica remained nearly the same, but at New Orleans there was an increase. This year there was no death at Mauritius, but a greatly increased one in Ceylon. The Ionian Islands, Malta, Gibraltar, Nova Scotia, had all reduced ratios; Bermuda had no death, while Canada maintained its previous rate, and on the home stations the Cavalry and Infantry were more sickly, but the Foot Guards less so. Thus, while a new wave showed itself at the Cape and St. Helena, that which last year was apparent at Mauritius and the Coast of Africa had diminished there, but was operating in Ceylon, the West Indies, and New Orleans; and that which in 1834 was active in the Mediterranean, Bermuda, Nova Scotia, and Canada, and among the Foot Guards at home, was now to be traced in Canada, and in the Cavalry and Infantry at home only.

In 1836 the deaths at the Cape were scarcely one-third of those in the previous year; there is no return for St. Helena. The deaths among the officers and squadron on the coast were both low. In the West Indies there was a great increase in the rate; in Jamaica it attained the lowest point of any year in the Table. At New Orleans there was no death from yellow fever. There was a considerable ratio at Mauritius, but that at Ceylon was much reduced

There was a slight increase in the Ionian Islands, a considerable one at Malta, Gibraltar, Bermuda, and among the Foot Guards and Infantry at home, while in Nova Scotia and Canada the previous rates were maintained. From these facts it appears that the wave embracing the West Indies and Ceylon, in 1835, was this year more developed in the former, though its action was passing off in Ceylon; it had extended to the Mediterranean stations and Bermuda, however, and was even perceptible in Great Britain. In 1837 this wave was still more strongly developed in the Mediterranean, Bermuda, Nova Scotia, and this country, and the following year led to much sickness, both here and through the north of Europe. It is a remarkable circumstance, too, that the wave which appeared at the Cape in 1835, and extended to Mauritius in 1836, was in full operation during 1837 and 1838, on the Coast of Africa and the West Indies, in both of which there were seven epidemics of yellow fever. As the returns, however, for many of the stations in the Table were not available for these years, it has been brought up to 1836 only.

A few notices of febrile disease in other places are added, to fill up the sketch for the period from 1830 onwards, each outbreak corresponding in time with the passage of one of the pandemic waves particularized above. Pali plague, which for some years had not been common, broke out at Marwar, in India, in 1836. Plague, which had been rife in Egypt and Syria up to 1829, continued in 1830, after which it was not frequently met with until 1834, when it broke out in Egypt and Constantinople, and the following year was very severe in Egypt. Petechial typhus continued at Naples in 1830.

The number of febrile cases admitted into the hospitals in this country already particularized, was—

Year.	London.	Cork.	Dublin.	Glasgow.	Edinburgh.
In 1830 ..	475	1,024	3,170	729	346
1831 ..	619	1,278	3,602	1,657	758
1832 ..	444	2,183	3,991	2,733	1,394
1833 ..	249	840	3,332	1,589	878
1834 ..	360	1,196	4,524	2,003	690
1835 ..	250	1,924	4,672	1,359	826
1836 ..	264	4,076	5,585	3,125	652
1837 ..	896	3,163	6,594	5,387	1,224
1838 ..	976	1,585	4,042	2,228	2,244

The amount of sickness in 1830, according to this Table, did not differ materially from that in 1829; but in 1831 the disposition to fever among the troops in the home stations pointed out above, was manifested among the civil population also by the increased number of admissions. The health of the troops improved in 1832; the same occurred in London in civil life; but in Ireland, and still more in Scotland, the sickness was greater that year. In 1833, though there was a slight increase among the Foot Guards and Infantry, the prevalence of fever diminished in civil life, but the following year it increased at each place except Edinburgh. In 1835 the increase extended to Edinburgh also, and continued in Cork and Dublin, though London and Glasgow had each an abatement. In 1836 mortality continued to rise among the troops; in 1837 this culminated, and the following year commenced to decline. The connection of this with the pandemic wave from the south has already been pointed out. It will be seen from the admissions at the various fever hospitals, that the populations which furnished them were under the same influence.

Fever was prevalent in Iceland in 1834-35, and typhus from 1836 to 1838. In the latter year intermittents prevailed to a very unusual extent along the Augerman River, in the north of Sweden, from lat. 62° N.*

The facts detailed establish conclusively the occurrence, between 1817 and 1836, of a series of oscillations of febrile disease, following each other with amazing regularity. These have been attributed to a cause or influence, which, from its extent and progressive character, has been designated a "pandemic

* Med. Chir. Rev., Vol. X. p. 372 (1852).

wave," the term epidemic referring rather to a single form of disease affecting a limited space.

What the nature of this pandemic wave and its mode of action may be, it is difficult to say; but certain deductions may be made with advantage from the facts concerning it set forth above. Of these the most striking is the constant course in the Atlantic and western part of the Indian Ocean, from south or south-east to north or north-west. This can take place in virtue of some law of nature only, and the situation of the magnetic poles immediately suggests itself as being in some way connected with it; but of this there is not at present any proof so far as I am aware.

Another point of more immediate importance, as bearing on some of the medical opinions of the day, has been alluded to several times in the course of this paper, viz., the occurrence of every form of fever under the operation of the same pandemic wave, yellow fever, remittent, intermittent, and continued fever, and plague, having prevailed in the localities in which they were endemic, as the wave passed over them. Sometimes, it is true, one of these forms invaded the territory of another for a while, and such intrusions have given rise to some of the most embittered controversies in the history of medicine. The principles here developed will place the evidence in connection with these unusual irruptions of disease in a new light, and contribute to reconcile the opposite opinions regarding them, giving us a basis to reason on epidemics better suited to the time, and the advance of our knowledge of the causes of disease, than that on which the subject was contested by Pym and Bancroft fifty years ago.

Though, as a general rule, the peculiar form of fever developed is that usual to the locality, still there are exceptions, and of sufficient importance to require more particular notice. Thus, yellow fever is only an occasional visitant at Sierra Leone, and on the Coast of Africa, Gibraltar, Bermuda, New Orleans, &c. Plague, though commonly confined to Barbary, Egypt, Syria, and Turkey in Europe, has shown itself elsewhere, as at Malta in 1813, in the Ionian Islands in 1815-16, at Noja, in Naples, in 1817. A type of fever, which first attracted attention at Rangoon and Calcutta in 1824, was seen in the West Indies and America in 1827-28. These casual irruptions of the new form of the disease have always taken place during the passage of a pandemic wave, and other places under the influence of the same wave manifested other forms of febrile affections. There are many instances of this; for example, in 1828, fever, chiefly yellow, produced a mortality at Gibraltar of 121·1 per 1000 of strength; at Santa Maura, the same year, the mortality from fever, chiefly remittent, was 149·7 per 1000; petechial typhus prevailed at Naples, and plague in Albania and the Morea, and over Turkey, Syria, and Egypt. If particular instances be taken, two fevers may be found in close contiguity: thus, plague appeared in Corfu at the end of 1815, in a marshy district, in which remittent had prevailed just before, and was thought to have been limited by quarantine, until it ceased in May 1816; that year it broke out in the village of Comitato, in a mountainous situation in Cephalonia, in the beginning of June; no means were taken to limit it before the end of the month, but nevertheless it did not attack any one out of the village, where it ultimately disappeared in the middle of July.* The garrison of Cephalonia in 1816, according to Hennen, consisted of 396† men, and the deaths from fever were 78, or 197 per 1000 of strength; the inhabitants also suffered more from fever that year than usual. Such facts lead to the conclusion that the pandemic cause can determine, to a certain extent, the resulting form of fever, though local and temporary circumstances may often be more powerful in this respect, and may even determine a different form, or suspend its operation altogether for the time, instances of which may now be given.

At Sierra Leone the prevalent fever was remittent, unless in 1823, 1829-30, 1837-38, and 1847. In these years yellow fever prevailed, but not exclusively. In the first three it broke out after some showers had fallen, but before the

* "Statistical Report on the Mediterranean," p. 39.

† "Topography of the Mediterranean," pp. 298 and 302. At page 283 the strength is stated in the text to have been "three hundred and seven," which would have made the mortality 254 per 1,000.

periodical rains fairly commenced ; and on these setting in heavily, the form changed to remittent. In 1823 there was a break in the rains, in the middle July, when cases of yellow fever appeared again, but on their recurrence, remittents only showed themselves. In 1837, on the decline of the rains, cases of the yellow fever again appeared. In 1847 the disease was later in showing itself ; the rains had commenced as usual, and 12·44 inches fell between the 4th and 24th June, and the early cases of fever were common remittents. From the 25th June to the 4th August, there were only 9 58 inches of rain, as against 31·33, the corresponding period in 1848. The first case of the yellow form occurred an the 29th June, and the disease prevailed during this period. The wet season was rather irregular in 1847, and dropping cases occurred at intervals afterwards, but chiefly during the periods of comparative absence of rain ; the majority of the attacks, however, were those from remittent. On the cessation of the rains, some other cases of yellow fever presented themselves*. These alternations of remittent and yellow fever, as the rain was more copious or scanty, show a connection between the meteorological conditions and the form of the disease too obvious to be overlooked. In fact, in Sierra Leone, as elsewhere, yellow fever is a disease of fine weather. A certain amount of rain, or moisture under the surface, must have preceded its outbreak ; but much of either checks it, until the return of more settled weather, with a brighter sky and stiller atmosphere. A striking instance of the power of heavy rain to suspend yellow fever was afforded at Newcastle, in Jamaica, in 1856, when the disease nearly disappeared for three weeks in November, during wet weather, but commenced again as it became settled and fine. The effect of rain, followed by a warm, still state of the atmosphere, in inducing fever, is described in a very interesting and circumstantial manner in Mr. Ralph's Memoranda on the Yellow Fever in the 2nd Regiment at Barbadoes, in 1816, and is well worthy of perusal.†

It is an interesting subject of inquiry whether the pandemic cause acts on the system, rendering that more susceptible of the influence of the ordinary causes of disease, or on these themselves, giving origin to a more concentrated, or a different kind of poison, which generates a more virulent, or a new form of disease ; or whether it affect both, increasing the activity, or altering the kind of the causes, and enhancing the liability of the body to be affected by them. Our information on these points is still very limited and unsatisfactory. I have observed that prior to, and during the prevalence of, an epidemic of yellow fever, the urine contained an unusual quantity of urrhodine, giving a deep reddish brown when treated with nitric acid and set aside for some hours.‡ Something similar has been observed with regard to cholera. These tend to show that the body itself is affected by the pandemic cause; but the observations require to be repeated, before much weight can be attached to them.

The outbreaks of epidemic disease have been referred immediately by some to the rapid generation and diffusion of myriads of microscopic animals, and by others to a similar production of vegetable organisms. The evidence in support of either is very defective. It may be well to keep the possibility of such things occurring in view, while we cannot be too cautious in admitting their efficiency, without adequate and irrefragable proof.

In the above remarks, the influence of the pandemic wave in producing fever only has been examined, but it is obvious in many other affections, of which cholera, diarrhœa, dysentery, and scurvy, are perhaps the most important. Even consumption and ulcers vary so much from time to time in frequency, as to suggest that they are similarly affected.

* These facts are mostly from the official reports of Barry, Schetlz, and Fergusson, to which I had access at Sierra Leone. The information for 1847 was the result of my own observation on the spot.

† In Bancroft's "Sequel to an Essay on Yellow Fever," p. 443. This work cannot be too strongly recommended to the attention of the junior medical officers in the army, as containing much interesting and useful information.

‡ Brit. and For. Med. Chir. Rev., p. 475.

OBSERVATIONS

On Pulmonary Diseases, and their Relation to Syphilis.

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Sometime has elapsed since the attention of the medical profession and the public was called to the alarming loss for many years sustained by the Army from the ravages of Pulmonary Consumption. Various causes were then assigned to account for the prevalence of this malady, of which over-crowding in barrack-rooms, night-duty, and want of variety in diet, appear to have been the most favoured. But although it was known, that, while phthisis thinned the ranks by death and invaliding, a most important deduction from the available strength of the Army was occasioned by the number of men constantly under treatment for venereal complaints, little importance was attached to what was regarded as a mere coincidence. In the minutes of the evidence taken by the Commission appointed to inquire into the Sanitary Condition of the Army, there is, however, a statement by Dr. Balfour, Deputy Inspector-General of Hospitals, which shows that this officer's attention had been directed to the subject, "I think" he says, "that another great cause of pulmonary disease among the Guards is the amount of syphilis, which I have not the least doubt, in men who have any predisposition to tubercular disease, is a very fertile cause of its being called into active operation."

About three years ago a very able paper by a member of the Army Medical Department, appeared in the Edinburgh Monthly Medical Journal, in which the author shows cause for believing, that, in the army at least, phthisis may in many cases be regarded as the product of syphilis; but he does not adduce instances in favour of this opinion. While admitting that statistics may mislead, I cannot but regard them as the most certain means at our command for eliminating truth, and I believe that to them we must look for an answer to the question,—does a large proportion of cases of pulmonary diseases, more especially phthisis, stand to syphilis in the relation of effect to cause?

I propose to take the cases of pulmonary phthisis which occurred in the 30th Regiment from its arrival from foreign service in September 1857, to its leaving the United Kingdom in June 1861, and to ascertain in what proportion of them the diseases in question could be satisfactorily regarded as produced by the action of syphilis on the system. In the following Table I have confined myself to such cases as died or were invalided; as these events form a very fair test of the actual presence of the disease. During this period, and long antecedent to it, I was attached to this corps, and possessed an acquaintance with the medical history of the individuals composing it. A very short time after the commencement of the period under review, my attention was directed to this subject, and I have been in the habit of making an examination of the lungs of patients discharged from hospital after treatment for primary syphilis, especially when their health appeared to be impaired, although secondary symptoms had not shown themselves; and of recording any facts of importance in my note-book. I have thus been able to trace the history of the disease at subsequent examinations of cases in which it occurred.

TABLE I.

Classes of Patients.	Died of Phthisis Pulmonalis while in Corps.	Died in Corps of other diseases, with which Tubercles co-existed.	Invalided for Phthisis Pulmonalis.	Invalided for Syphilitic Affections co-existing with Phthisis.	Invalided for other affections with Disease of Lungs, believed to be tuberculous.	Total.
I.—In whom the system had been deteriorated by Syphilis	8	2	21	5	7	43
II.—In whom this could not be proved..	3	..	..	..	..	3
III.—In whom its existence was doubtful	1	..	1	..	2	4
Total	12	2	22	5	9	50

It appears from this Table that out of 50 men who died or were invalided for phthisis, or for affections with which it co-existed, evidence of deterioration by syphilis existed in no less than 43. In 4, the proof was insufficient, while in 3 others, (although in 2 at least there was reason to suspect that that disease might have played a part in inducing debility), no evidence could be produced to satisfy me that it had done so. The cases I shall relate will sufficiently convey what I mean by the term *deterioration of system.*

Since the departure of the regiment from the United Kingdom, three cases of pulmonary phthisis have presented themselves in patients of whom two,—Walsh and Eyers (*see* cases)—were manifestly broken down by syphilis, in the remaining one, no such evidence was forthcoming.

The number of cases given, may perhaps appear to be small, but I think it advisable to take such only as came under my own particular notice. I may, however, mention that I have seen many men in other corps, in whom the history of the disease pointed to an attack of syphilis as its starting point. Although I believe that the connexion between the one disease and the other, is not so frequently met with among the civil population as in the army, yet that it does frequently exist, I feel perfectly satisfied from such observations as I have been able to make in the hospitals of large cities, and from cases which have been casually brought to my notice.

Happily all cases of secondary syphilitic disease do not terminate in phthisis. What then are the causes which superinduce the one cachexy on the other? A very plausible theory is that syphilis is most severe in subjects predisposed to phthisis, or, in other words, that the scrofulous individual is most liable to severe attacks of syphilis.* On the other hand, we may throw the onus on the shoulders of mercury; or, with still more appearance of probability, it may be said that as the use of this mineral is known to be ill borne by scrofulous individuals, its administration in such cases may lead to tubercular deposition in the lungs.

With regard to the first proposition, Mr. Holmes Coote, says, "I have never noticed any connexion between that state of constitution commonly called scrofulous, and a predisposition to secondary syphilis. As has been remarked, constitutional syphilis attacks, without much distinction, old and young, strong and weak, rich and poor, male and female." Others again have endeavoured to trace a connexion between the *hard* sore and a scrofulous state of system. I cannot say that I have observed this sore to be so peculiarly apt to entail secondary affections more frequently in this habit of body than in others, but

* Mr Acton says, "It might be said with more truth, that the consumptive individual presents the most severe case of syphilis; still I am ready to admit, that when syphilis occurs in delicate persons, it may develop the seeds of scrofula, and in this it will be aided by the injudicious use of mercury."

when such sequelæ do occur, they are distinguished by unusual severity. It certainly appears of little moment by what agency the constitution is depressed; if it be so, secondary disease is liable to follow the primary ailment. Still scrofula cannot be said to prevail to a great extent in the army, as marks of its presence in a recruit forms an unqualified ground for rejection. Soldiers may be considered as "picked lives," and although during the Crimean War and Indian Mutiny, a class physically less eligible than formerly was admitted, the 30th Regiment, at least, has always contained a considerable proportion of old soldiers. I am unable to give the ages and services of the men invalided, but I insert these particulars in the case of those who died of phthisis.

Table II.

Ages.	No.	Service.	No.
Below 20	2	Under 1 year	1
Between 20 and 25	5	Between 1 and 2 years ..	0
Between 25 and 30	3	Between 2 and 3 „ ..	3
Above 30	2	Between 3 and 5 „ ..	2
		Between 5 and 8 „ ..	3
		Between 8 and 10 „ ..	2
		Above 10 „ ..	1
Total	12	Total	12

The average age was 25½, the average period of service 5 years and a fraction. Most of the cases died shortly after 1857, and consequently must have enlisted prior to the Crimean War, when a good selection could be made. On looking over the names of the invalided men, I find that the same observation holds good with regard to them also.

"Syphilis," says M. Ricord, "is the spur, and mercury is the whip, which hurries along the phthisical to their graves." Without entering into any controversy on so vexed a question as the use of this mineral in the treatment of syphilis, I may say, that in scarcely one of the cases referred to were mercurial preparations given for the primary affection; and, as a rule in the earlier cases, they were withheld even in the secondary forms of the disease, except in cases of iritis.

The comparative youth of the soldiers of the present day might be sufficient to explain the frequent occurrence of phthisis among them; whether syphilis did or did not play as important a part a few years ago in inducing consumption as it appears to do at present, the last table, as well as the general statistics of the whole army at home, incline me to consider such an explanation unsatisfactory. In former times overcrowding in barrack-rooms no doubt exercised an injurious influence on health, and the same may still be said with regard to the less easily avoidable night-duties and severe drills. The first case I shall mention, and I could supplement it with many others, shows, that when a man is for a time relieved from duties necessitating much exposure, particularly at night, the deposition of tubercular matter in the lungs may remain stationary, or the deposit may become re-absorbed, if not prevented by a return to them; and it may be surmised that any duty involving constriction of the chest, or impediment to the free action of the lungs, may even induce such deposition. Night-duty will chiefly act by inducing bronchitis, which, although frequently said not to cause phthisis, has, in the cases of which I speak, as I shall afterwards show, no unimportant influence. The predisposing circumstance to which I shall allude lastly, though by no means entitled to this place in point of importance, is *habits of dissipation*. A large proportion of my cases occurred among hard drinkers, who as such were exposed not only to the direct effects of intemperance, but also to exposure to vicissitudes of weather when intoxicated, and to punishment, by severe drill or incarceration.

Having alluded thus briefly to the etiology of this disease, I proceed to notice its history and diagnosis, as illustrated by the cases which have come under my notice. The relation of the leading features of a few instances, out of many of which I have preserved notes, will be appropriate here. I have

frequently left out the stethoscopic signs and other particulars where such details did not appear to be essential to the elucidation of the subject.

Private Thomas Dashfield.—Thirty years of age, with a service of eight years, was, up to the spring of 1858, a healthy and remarkably fine-looking soldier. At that time, while stationed in Dublin, he contracted a small sore on the glans penis at the sulcus, which was not treated until detected on his becoming an inmate of the guard-room. Treatment simple. A large indolent bubo formed in one of the groins, which, after a time, suppurated, and long delayed his discharge from hospital. Owing to his general intelligence, he again obtained employment which did not necessitate exposure, and remained in tolerable health till the 30th December, when he was admitted into hospital with a plentiful scaly eruption, where he remained till the 4th of April following. This affection was complicated with iritis, requiring the exhibition of mercury for its cure. During the latter portion of his stay in hospital he took cod-liver oil, as, on examination, some condensation of the apices of the lungs was discovered. On the removal of the regiment to the Curragh Camp, in October 1859, he was appointed to serve in the Fire Brigade, and thus for a while escaped night duties and the fatigues of drill. He continued to enjoy a tolerable degree of health till called to extinguish a fire one night, on which duty he caught cold, and on the 1st of September was admitted with a severe attack of bronchitis. Symptoms of phthisis supervened, and becoming more and more distinct, led to his being invalided, and eventually to his discharge from the service.

Private John Veitch, aged 33; service 15 years; had the appearance of a robust individual, on admission, on the 21st July, 1859, for a non-indurated sore on the prepuce. Next day a swelling appeared in one of the groins, which remained indolent for a long time, but at length suppurated, leaving an unhealthy sore which was slow in healing. Treatment, non-mercurial. On the 27th, ordered three grains of the iodide of iron three times a day. In the beginning of August there was some comparative dulness, with unnatural clearness in the propagation of the cardiac sounds at the right infraclavicular space. On the 15th these signs had become very distinct, while a sparse pustular eruption began to spread over the forehead and back. This gradually became tuberculated. On the 22nd it was extending to the abdomen. He complained of sore throat, but no ulceration was visible. 29th.—Vocal resonance increased in the situation already indicated, and at the corresponding point behind. Breath-sounds harsh, with a slight increase in the duration of the expiratory murmur. Not much cough, but expectorates frothy mucus. Pulse 90. Not improving, but signs of tubercular deposition becoming more undoubted. Was sent to the General Hospital in Dublin, and was thence invalided.

Private James Ricketts, 38 years of age; service 15 years; healthy appearance; admitted the 18th May, 1858, with a large superficial indurated sore on the prepuce, with the appearance of having existed several days. A papular eruption covered the body, which, according to his own account, depended on a previous sore, but this appeared doubtful. Up to the 30th took bichloride of mercury, without affecting the mouth; it was discontinued, and the iodide of potassium substituted in doses of five grains three times a day. Was not discharged till the 8th of September. Re-admitted 26th of January, 1859, with a papular eruption chiefly affecting the skin of the extremities. Ordered bichloride of mercury with sarsaparilla. The existence of tubercular matter at the apex of the right lung was suspected, although its presence could not be actually determined. Discharged on February 15th.

On re-admission on the 25th of April, all doubt as to the existence of the chest-affection was removed. He was ordered cod-liver oil, which he took for a lengthened period without benefit. Its use was for a short time suspended for that of the tartrate of iron, but the latter seemed to occasion uneasy sensations in the chest. On the 26th of June his left thigh began to swell, and at the time of his death, on the 4th of July, had attained an enormous size. Large cavities were found in the upper portions of both lungs. Veins of left leg were filled with coagulated blood. A mass of cheesy matter surrounded and compassed the common iliac vein.

Private William Turner, aged 22; service 2 years, a powerfully-built man of considerable intelligence. Contracted a hard sore on sulcus, between glans

and prepuce, for which he was treated without mercury from 15th of January to the 24th of March, 1860. Shortly after his admission into hospital he complained of rheumatic pains affecting the muscles of the thorax, and, during the latter part of his stay there, had a few spots of a suspicious nature on the shoulders. Prior to the appearance of these, comparative dulness on percussion near the left clavicle was observed, but this seemed to be explained by hypertrophy of its cartilage, a condition I was at that time unable to account for owing to this being one of the first cases in which I noticed such a peculiarity. Undoubted symptoms of phthisis soon afterwards made their appearance, for which he was invalided. The diagnosis was made while I was absent from the corps on other duty.

Private William Chillens, age 21; service, two years. Sallow complexion, usual health good. From May to October 1859, was three times under treatment for ulceration on the penis. These were not followed by any cuticular eruption, but by an attack of iritis, which was subdued by means of mercurials. About the same period, tubercular deposition affecting the apices of both lungs was diagnosed. An attack of hæmoptysis soon confirmed this. He recovered from the hæmoptysis, but had eventually to be discharged the service, as the lungs became hopelessly diseased, and the system completely impregnated with syphilis.

Private Arthur Wyatt, aged 20; service, 1 year. Generally healthy. Was admitted into hospital 16th March, 1860, with a secondary eruption of the skin of a squamous character, and accompanied by a good deal of fever; had a primary sore three months previously, the nature of which is not recorded. On admission the periosteum over the whole of the exterior, superior, and inferior surfaces of the right clavicle seemed to be increased in thickness. An examination by the stethoscope showed that the apex of the lung of the same side had to some extent become solidified. On the 20th, it is noticed that the heart's sounds were much altered in character, a rather common circumstance in secondary affections. A few doses of hydrag-cum-creta were exhibited, under which the eruption faded away. He was re-admitted on the 17th of the next month, while I was detached from the regiment, but the notes kept in the case-book by the medical officer who attended him show that the tubercular deposit continued to increase. A month afterwards he was invalided.

Private William Fullon, aged 24; service, 3 years. Stoutly made, habits irregular, though not drunken. Came to hospital on the 24th February, 1860, with a large ordinary sore on the body of the penis. Treatment simple, except that some mercury was exhibited so as scarcely to touch the mouth, along with antimony and opium for an attack of acute pleurisy, which appears to have been subdued by this treatment. On 14th March, complained of pains in the back and shoulders; chest healthy. On the 22nd it is reported that the sore had healed some days previously, but that since that occurrence the pains had become aggravated. Slight dulness in right infra-clavicular space. Fulness of the left clavicle. No alteration of importance in breath-sounds. On examining him, at the end of May, I found that he had lost flesh, and that there could be but little doubt of the existence of tubercles, at least at the apex of the left lung; these appeared to be in a very chronic condition, but the belief in their existence was shared by several other medical officers.

The next two cases are those of men still under treatment, and are not included in the preceding Table.

Private Richard Walsh, aged 26, service 8 years. On the 15th August, 1860, was found to have two minute sores at the reflection of the prepuce, hard and dry. These could only be recognized on careful examination, on which account they had existed, there is reason for believing, for some time prior to his admission into hospital for muscular pains and an exanthematous eruption, with a small bubo. The last contained a very small quantity of pus, and soon healed, although considerable hardness of the glands remained. The chest was perfectly healthy. On the 6th September, a papular eruption had replaced the former one. Some dulness under both clavicles, but most marked under the right. Increase in vocal resonance was, however, better marked on the left, extending to the corresponding point posteriorily. Breathing harsh and jerking. Great bulging over both clavicles. Conjunctivæ red, and of a muddy appearance. Treatment, mild mercurials, followed by sarsaparilla and quinine,

with cod-liver oil. On the 9th December, 1861, I observed, from his appearance at the health inspection, that the hopes I had entertained of his improvement were disappointed. On being sent to hospital, he was found to present every indication of consumption.

Private James Eyres, aged 24; service 6 years. Prior to the beginning of 1859, enjoyed good health. He then contracted a sore, which healed in nine days. On March 15, 1860, was admitted for a copper-coloured eruption. Sternal end of right clavicle was then observed to be remarkably protuberant. Chest apparently sound. During progress of treatment had iritis. Sent to general hospital, Dublin. On rejoining the regiment, he returned to duty, which brought on a relapse. 1st August, complained of pains in the intercostal muscles. Took iodide of potassium. Iritis again appearing, mouth made slightly sore with mercury. On the 13th, comparative dulness, with increase of vocal resonance at right infra-clavicular space. On applying the stethoscope, sibilant rales were heard in that situation; bulging of both clavicles, but more especially of the right. Soft parts in right infra-clavicular space swollen, and pitting slightly on pressure. Skin of a sallow dirty hue. On the 23rd of February, 1862, these abnormal conditions, with the exception of the pitting, were much more pronounced. 24th of April, left clavicle bulges more than at date of last report. 3rd of May, complains of cough. Dulness under both clavicles. No stethoscopic signs of the existence of tubercles. 10th of February, 1862: since the first appearance of secondary symptoms, he has been losing flesh. Emaciation is now great; sternal end of left clavicle very prominent; that of the right not nearly so much so as before; dulness most marked in the former situation. Proofs of the existence of a moist cavity at the apex of the right lung very obvious, with the usual signs of phthisis presenting themselves.

In all these cases the history is very similar. The patient contracts a sore, frequently of the hard kind, and, in a great many instances, when either on furlough, intoxicated, or in some other unfavourable hygienic condition. Indeed, in a large proportion of instances, the sore was discovered when the men were prisoners in the guard-room for drunkenness, or, what very often amounts to the same, absence without leave. Convalescence in most was tardy, although in a few cases the reverse, and the existence of suppurating bubo was common, while in most of those in whom this was not present, there was some degree of hardness perceptible in the groins for months, or even years. The character of the secondary skin-affection varied, in the worst cases it was usually squamous. Frequently, as the first crop of blotches was dying away, signs of condensation at the apices of the lungs were manifested; but, in a large proportion, the first intimation of such a condition was given by the men requiring treatment for an attack of bronchial inflammation, or rheumatic pains.

Pathology.—It is reasonable to suppose that many soldiers have an hereditary or acquired predisposition to tubercular deposit, on the application of any depressing agency. Such a one is found in syphilis, and the origin of phthisis in such cases is easily thus accounted for. There are, I believe from reasons I will proceed to show, other cases where the deposit is not at first tubercular, but syphilitic. This may either be converted into tubercle, or by its presence may give rise to such inflammation as will lead to the deposition of that substance. This latter appears to be the more likely, but the former is by no means an improbable supposition, as M. Grassi observes that in the advanced stages of syphilis, the blood globule is converted into albumen. Cases have been observed by M. Ricord and others, where there was in the tertiary stages of syphilis, coincident with the formation of the syphilitic tubercle in the submucous and subcutaneous tissues, a deposit of syphilitic matter in the lungs, discovered after death, and giving rise during life to the symptoms of phthisis. Dr. Stokes says, "Secondary syphilis simulates phthisis when the syphilitic hectic exists with the bronchial irritation. If, as is often the case, there be periostitis of the ribs or sternum, the symptoms are identical." Syphilitic matter is then, in the opinion of competent observers, deposited in the lungs in such a manner as to be undistinguishable from genuine tubercle during life. M. Ricord says, "I must solemnly warn you not to confound the suppuration of a few syphilitic tubercles in the lungs, with phthisis." The cases to which he alludes, however,

are instances in which the system may be said to have been worn out by syphilis, and in which we might expect to find its presence in all the organs. Some of Dr. Stokes's cases must be referred to the same category. But, having proved that syphilitic matter is, in certain cases, deposited in the lungs, we may advance a step farther, and attempt to show that it frequently manifests its presence there shortly after, and, in some cases, even anterior to its manifestation in the skin.

I said that I considered bronchitis a very powerful agent in causing the deposition of tubercle, but it is, I believe, in these cases, very frequently originated by the previous pouring out of syphilitic matter on the mucous surface of the smaller bronchial tubes. So important do I believe the disease to be, that I think it merits a description.

Dr. William Munk believes "syphilis displays itself under the varied forms of bronchitis, pneumonia, and broncho-pneumonia. With regard to the last two, although I have observed one case at least in which the substance of the lungs had been attacked with inflammation apparently dependent on syphilis, I pass them by, and proceed to show that syphilitic bronchitis is no unimportant disease. Its existence, however, is denied by Mr. Acton, who states, "I am unaware of having observed cases of acute bronchitis or pneumonia coming on during the course of secondary symptoms." When they appear, he regards their presence as fortuitous." I beg to quote from Mr. Acton's work, Dr. Stokes' observations on the subject. "With respect to the bronchial system, we may observe the disease as an acute or mere chronic affection. In the first instance it is analogous to the bronchial irritation of the exanthemata, of which I have seen a few interesting examples; while, in the second, there is chronic irritation, which, when combined with the syphilitic hectic, and with periostitis of the chest, closely resembles the pulmonary phthisis. In the first of these cases, I have observed that after a period from the first contamination, the duration of which has not been determined, the patient falls into a feverish state, and presents the symptoms and signs of an irritation of the bronchial membrane. These having continued a few days, a copious eruption of a brownish red colour makes its appearance on the skin, and the internal affection either subsides, or becomes visibly lessened." Here we see the bronchial membrane taking on an action which is peculiar, and very different from its ordinary irritations. There is an inflammation analogous to that of the exanthemata, and no doubt can exist that it is connected with the syphilitic poison. My friend Dr. Byrne, whose situation as Medical Officer of the Lock Hospital gives him the greatest opportunities of observation, informs me that he has in many cases seen patients who had been formerly diseased, and who had come into hospital either for new sores, or for gonorrhœa, attacked with intense bronchitis and fever. This attack would come on suddenly, and the distress be so great as to necessitate bleeding, the effect of which was, that soon after a copious eruption, often combining lichenous and squamous forms, made its appearance with complete relief to the chest. In some of these patients, on the day before the eruption, the stethoscopic signs had been those of intense mucous irritation, and yet, when the skin disease appeared, the respiration became either perfectly pure, or only mixed with an occasional rhonchus in the large tubes. The same gentleman has observed the reverse of this, as, when a syphilitic eruption has been repressed, the bronchial membrane has become much engaged, and the patient affected with general febrile symptoms. These phenomena subsided after bleeding and mild diaphoretics, which had the effect of restoring the cutaneous eruption.

Here we have an additional evidence in favour of the analogy between syphilitic bronchitis, and that of the exanthemata. Dr. Munk considers the chronic form "the morbid action creeping gradually and slowly from the larynx and trachea to the bronchial tubes"† as the most common, but believes that the other does exist. I have quoted Dr. Stokes' remarks, as they describe very accurately cases which frequently come under my own notice. The case of Fullon illustrates his observations as to the relief of the chest symptoms consequent on the appearance of the skin affection. This man became the

* "Diseases of Urinary and Generative Organs," p. 573.

† "Diseases of the Chest," p. 93.

subject of phthisis; but I add two cases in which the men left the hospital to all appearance recovered.

Private William Tucker, aged 24; service 3 years. Admitted 4th November, 1860, with indurated sores on glans and prepuce. Treatment simple. I did not see him until the 28th, when the sores were healing. On the 7th of the following month a few papulæ appeared on the shoulders. On the 12th he was attacked with bronchitis, followed by a copious eruption, which soon became scaly. Chest symptoms disappeared under the use of hydrag-cum-creta pushed so as to affect the mouth.

Private James Jones, aged 24; service 2 years. Discharged from hospital, where he had been under non-mercurial treatment for a small sore on the prepuce (which I did not see, and consequently cannot describe), and a bubo, on the 31st November, 1860. On the 5th of December he was re-admitted, with intense bronchitis, which left him on the outbreak of a papular eruption on the 4th day. In this case inflammation was most severe, with accompanying distress, and resolution extremely abrupt.

Considering the intimate connexion there is between the mucous surface of the respiratory organs and the skin, and the proneness of the throat (that part of the former membrane in which we can with most facility observe any change) to become affected, we cannot wonder that syphilis should frequently show the earliest indications of its presence in the system by affecting the lining membrane of the bronchi. If, then, syphilitic matter be deposited in the one locality, it may also in the other, and we can easily imagine that the inflammation thereby set up may cause the pouring out of fresh material of the same kind, even to such an extent as to block up the smaller tubes, and to simulate phthisis. I am disposed to believe that many cases which present the characters of the latter disease, are really instances of mere syphilitic deposit. I might easily detail cases illustrative of this view, but am unwilling to protract this essay unduly There are in the 30th Regiment, at the present time, three men nearly equal in height, each measuring about 5 feet 11 inches. Each of them contracted syphilis, and each of them presented all the stethoscopic signs of phthisis for about three years. Two of them I had reason to fear would have succumbed, but they are now enjoying average health, while the condition of their lungs is becoming more satisfactory. There are likewise others in whom the conformation of the body is less indicative of predisposition to tubercular deposits, where the progress towards recovery has been much more rapid.

Diagnosis.

Dr. Graves, speaking of syphilitic pulmonary disease, asks, how are you to recognize it? Mainly by the history of the disease. If the patient's sufferings have commenced at a period of time after primary sores on the genitals, when secondary symptoms usually make their appearance; if some of his complaints are clearly traceable to this source; if, along with debility, night sweats, emaciation, nervous irritability, and broken rest a night, we find cough; and if this group of symptoms have associated themselves with others evidently syphilitic, such as periostitis, sore throat, and eruption on the skin, then we may with confidence refer all to the same origin and may look upon the patient as labouring under a syphilitic cachexia affecting the lungs as well as other parts. We must not draw our conclusion until we have repeatedly examined the chest by auscultation and percussion; if these fail to detect any tangible signs of tubercles, we may then proceed to act upon our decision with greater confidence. Although it is perfectly easy to diagnose between the syphilitic deposit and the advanced stages of phthisis, I do not feel so confident in being able to discriminate between it and the initiatory condition of the latter. Every symptom must be of value in such a case, and I think I have observed a sign which may be in most cases relied upon.

It will be remembered that in some of the cases I have narrated (and I might with truth have inserted in the account of many of the others), mention is made of a thickening of the clavicle. I have noticed that when syphilis manifests itself in the lungs to such an extent as to resemble tubercular deposition in its symptoms, there is, in the majority of the cases, a thickening of the periosteum of the head of one or both the clavicles, and of the peri-

chondrium of one or more of the upper costal cartilages, with frequently a tumefaction of the soft parts between them and the skin. For this phenomenon I can offer no explanation, but can only say that I have observed and demonstrated its presence to the satisfaction of others. This condition was, however, regarded by Boglioi as a sign of latent syphilis; but no one has yet, I believe, connected its appearance with disease within the chest. It is true that Dr. Stokes mentions periostitis as a frequent accompaniment of this class of cases, thus complicating the diagnosis (*see* case of Eyres); but it is difficult to understand whether he referred to this condition, or to inflammation affecting the ribs in the tertiary stages of the disease. It must be understood, however, that tubercle may be secondarily deposited in the manner in which I pointed out, and this condition of the parts remain. This seems to have been the case in most of the instances I have mentioned. I ought to observe that it is seen in men of different trades, and as frequently on the left as on the right side of the body. I will only notice the cases of two persons of intelligence.

I was consulted on the 22nd February, 1861, by A. B., aged 24. He stated that he contracted a sore in the preceding August, which he neglected. A bubo formed, and he was long under treatment. About three months after the outbreak of the sore, he noticed considerable swelling over the left clavicle, on showing which his medical attendant expressed surprise, as he had no appearance of eruption on the skin. I found the condition he described, along with other appearances of secondary disease. The apices of both lungs were in an unsatisfactory condition, leading me to fear that tubercles might be deposited, especially as his general appearance was suggestive of such a state. Cure was long delayed; but he has lately lost all his unfavourable symptoms, and is quite as strong and healthy as before.

C. D., aged 22. On the 24th November, 1860, he perceived a small sore on prepuce, but believed that it might have existed several days prior to discovery. He was treated in London. I saw him in the middle of the following February, when he had suffered from a lichenous eruption. Great loss of flesh. On the 7th March there was comparative dulness at the apex of the right lung, with increased vocal resonance. Breath-sounds on both sides, in this situation, unusually harsh. Sternal extremity of the right clavicle bulged very much. He improved slowly during the time he was under my care. Some time afterwards I met him in the street, when his general appearance was less haggard, but I had no opportunity of examining the state of his chest.

Prognosis.

From what I have said in attempting to define the various abnormal conditions of the lungs met with among individuals affected with venereal disease, it will be apparent that the prognosis is good as long as the lesion is merely syphilitic. Until I adopted this view, I was led to take a more hopeful one of the chance of recovery for phthisical patients than most practitioners consider themselves warranted in entertaining.

Treatment.

This depends upon our diagnosis :—

1. If the case present the usual appearances of phthisis, due only to the inroad of tubercle or the weakening of the system through syphilis, then the usual plan of treatment may be pursued; but,

2. If there appear to be a mere deposition of syphilitic matter, such remedies seem to me to be unable to cope with the affection. We must then use those best adapted for the syphilitic diathesis. First among these, in point of notability, ranks mercury, which, from a quotation already made it will be observed that an experienced physician recommends, even at the tertiary epoch. I am inclined, however, to agree with the following remark of Mr. Acton's :—"When we have reason to suspect the existence of syphilitic tubercles in the lungs, recourse should be had to iodide of potassium, and mercury must be used most sparingly. When we have to treat true syphilitic phthisis, the surgeon should treat the patient on general principles, and, not-

withstanding the high position of Dr. Graves, I dissent from his recommendation of giving mercury, which I believe must be generally prejudicial."*

When the disease of any organ belongs to the tertiary period, experience shows us that iodide of potassium is of more value than mercury. In the secondary manifestations of syphilis, the reverse is the case. When the lungs are affected shortly after the existence of the primary sore, I have found great benefit to arise from the use of mercury. I will mention one case—

Private John Mullane, aged 22; service nearly three years. When I took over charge of the detachment hospital at St. Peter's, Jersey, on the 14th of March, 1861, I found this man suffering from phymosis and bubo, for which he had been under treatment for ten days. On slitting up the prepuce several sores were found, nearly healed. He had a sparse pustular eruption over the body.

April 23.—The skin of a dull leaden hue; complains of pain in chest, with cough; great enlargement over the sternal extremity of the right clavicle and the cartilages of the three uppermost ribs. In this situation there is comparative dulness, which may, however, depend upon the swelling noticed above; an anæmic murmur; eruption scaly. Till the 12th used iodide of potassium in five-grain doses repeated three times a-day, without benefit. Since that time he has been using hydrag. c. creta. As no benefit seemed to have arisen from the latter remedy, which had not been pushed to affect the mouth, I now resolved to do so.

May 1.—Eruption leaving gradually; cough gone; gaining flesh.

5th.—Discharged.

Re-examined 19th, when his state was as follows:—Both infra-clavicular spaces equally dull; vocal resonance over right almost approaching to pectoriloquy. Here the heart sounds are propagated with unusual clearness. Pulse 80 per minute, stronger than before; breath-sounds tolerably healthy. Again examined in October. Had suffered considerable loss of hair; complexion very dull, but the chest-sounds much more normal in character.

I would not have it understood that I advise mercury in all cases of this kind. In fact I am not in the habit of using it in any case of secondary syphilis, unless I see peculiar reasons for its administration. The same remarks apply to the use of this mineral in syphilitic bronchitis, except that in this affection, its influence is better marked. Cod-liver oil, so justly esteemed as a mode of conveying fatty matter into the system in phthisis, may be tried; but in cases in which the deposition of tubercle has been preceded by that of syphilitic matter, I entertain but little opinion of its usefulness. In most of these cases, in reality, the appetite is comparatively but little impaired.

In the way of prevention, much may be accomplished. Every medical officer knows the effect of confinement in hospital. The patient must necessarily be subject to this; let it, therefore, be made as little injurious as possible. It is sometimes imagined that any accommodation is sufficient for venereal patients, a great error, as I know of scarcely any disease which more urgently requires that plenty of cubic space be afforded. Under the new regulations on this subject, little will remain to be desired; but, besides space in the hospital ward, I believe that the patient should be compelled to seek fresh air outside its doors; in fact, that he should take exercise.

NOTICE OF PULMONARY LESIONS ASSOCIATED WITH SYPHILIS.

By William Aitken, M.D., Professor of Pathology in the Army Medical School, Netley.

The influence of syphilis on the health of the army is powerful for evil. Dr. Graham Balfour has amply proved this by the medical statistics at his disposal; and has formally directed the attention of the profession to the fact in several published papers. For much of the exact knowledge we possess

* "Diseases of Urinary and Generative System," p. 576.

regarding the pathology of syphilis, we are indebted to the medical officers of the army and the navy. As the cases of syphilis in these services are under more or less close observation for many years, the final results of the disease upon the organs and tissues of the body can be more accurately determined during life and after death in the soldier and sailor than perhaps in any other class of men.

Foremost amongst the evils engendered by syphilis, is the *deterioration* of the constitution. A condition of ill-health or cachexia is undoubtedly established; and the development of lesions essentially specific are brought about in many of the internal organs. There is perhaps no morbid poison—the paludal or malarious poison not excepted—which has so extensive a range of influence as the syphilitic poison. Hardly any organ is exempt from its destructive ravages; for its virus seems to exert its power chiefly on the connective tissue, and that tissue takes a part in the structure of every organ of the body.

The medical periodicals for several years past, as well as several monographs on the subject, and the records of the Pathological Society of London, have been mainly instrumental in demonstrating the very remote effects which syphilis exercises upon the organs and the constitution of man. Great advances have thus been made in the pathology of syphilis—advances which are due to clinical, experimental, and post-mortem observations. It has now been clearly shown that many doubtful cases of ill-health are in reality due to the influence of the specific poison of syphilis; the morbid effects of which may not be fully developed till many months, and even years, after the primary infection.

Hitherto the surgeon has claimed syphilis as his peculiar field; but after the surgeon had healed the sore, the morbid influence of the poison in many cases still remained; and when internal lesions, in the natural course of events, became developed, the impairment of health and the degenerated or deteriorated condition of the constitution eventually brought the patient to consult the physician as well as the surgeon. But in studying the pathology of syphilis, the *pure* surgeon and the *pure* physician must each condescend to forget his purity; for the relations of the syphilitic poison are now seen to be so complicated, so vast, and so important, that the physician and the surgeon must each combine their knowledge before the many obscure points in the pathology of syphilis can be fully cleared up. It is greatly owing to this artificial and unscientific division of the wide field of medical practice into surgery and medicine that the phases of opinion regarding the pathology of syphilis have been so remarkably diversified and contradictory. The surgeon alone in civil practice, as a rule, sees the primary infecting sore of syphilis, and only by chance may see the development of all the subsequent lesions, now so important in pathology. The physician, on the other hand, rarely sees a primary syphilitic sore; and when the victim of secondary or tertiary syphilitic lesions comes to consult him, the case may have become extremely complicated—"mixed up with and overlaid by other constitutional and local diseases;" and these in their turn are made more serious by the pernicious influence of syphilis. The army medical officer is untrammelled by the artificial division of medical practice into medicine and surgery, and there is no disease which so demands his undivided attention and careful study as the pathology of syphilis; and especially as regards the various morbid processes to which the syphilitic poison gives rise, the circumstances under which the specific diseased actions develope themselves, and the final results which are eventually produced upon the internal organs of the body.

The more remote effects of syphilis, concerning which definite information is very much desired, may be embraced in the two following heads:—

(1.) *The constitutional cachexia or specific condition of ill-health, associated with* (2) *certain definite anatomical lesions, and especially the growth of new material from the elements of connective tissue, mainly assuming the form of a "gummatous tumour" or nodule; of which the node on the shin-bone is the most common and familiar type.*

These nodes are now known not to be confined to the bones. They are developed in the sub-mucous and sub-cutaneous connective tissues, in the liver, in the lungs, in the brain, in the heart, in the common muscles, in the testicles, and in the delicate tissues of the eye.

The constitutional tendencies of the individual also materially influence the phenomena which supervene during syphilis : *e. g.*, gout, rheumatism, and tuberculosis modify the growth of syphilitic lesions, and the degenerations associated with the syphilitic cachexia, especially as to site.

Persons with a tendency to rheumatism, or who have suffered from rheumatic fever, are apt to have those tissues involved which are prone to attacks of the rheumatic inflammation. Hence syphilis is not unfrequently set down as a cause of rheumatism ; and in such cases the serous, fibro-serous, and white connective tissues are especially the sites of the specific node, giving rise to periostitis iritis, corneitis, and inflammation of the true skin.

Persons who have a tendency to tuberculosis are apt to have those tissues especially involved which are prone to the attacks of tuberculous inflammation. Hence syphilis is not rarely set down as a cause of phthisis, and in such cases the mucous tracts are most prone to suffer from the growth of the material which composes the syphilitic node and which tends to ulcerate at an early stage of its development. Hence the tonsils, the tongue, the larynx, the pharynx, and the lungs are the sites of lesion, which assume a variety of forms.

Persons who have a tendency to gout, and in whom for the most part the vascular system is more particularly expressed, the arterial or vascular structures, and the synovial tufts of the joints are the most prone to suffer from the pernicious effects of the syphilitic poison ; and in them the lesions are chiefly developed in the form of degenerations. Hence, in young subjects who have suffered from syphilis it is not uncommon to find the large arteries near the heart presenting those peculiar cicatricial lesions which, in the aged, result from loss of substance, and which are generally associated with atheroma. Hence it will most probably be capable of proof that syphilis is a very potent cause of disease in the great blood-vessels, tending, at a comparatively early age, to the formation of aneurisms. Certain it is that syphilis is found very frequently associated with amyloid degeneration of the small blood-vessels, especially obvious in the liver, the kidneys, and the villi of the intestines.

The lesions just noticed eventually assume a great variety of anatomical forms ; but in the first instance they are to be recognised in the typical form of *nodes* or *gummatous nodules*. The minute structure of these gummatous nodules has been closely examined by many observers. This gummatous nodule consists of a growth of elements which leads to the development of an elastic tumour composed of a well-defined tissue, and the elements of which are extremely minute. The tumour takes origin from the connective tissue or the analogues of such; and hence the universality of the site of syphilitic lesions. When these are sufficiently large to attract attention—as in the form of a node on the shin-bone, or on some part of the true skin—they are small, solid, pale knots, like a hard kernel, about the size of a pea. They are generally first seen on some part of the true skin or sub-cutaneous or sub-mucous tissue ; and when the tissue in which they happen to grow is sufficiently lax, they grow to a considerable size, and convey to the touch a sensation as if they were filled with gum. Repeated examinations of this growth show that in its gelatinous or soft state it arises from a prolification of nuclei amongst the elements of the connective tissue, not unlike the formation of granulations in a wound. The component cell elements appear as round, oval, or oat-shaped particles imbedded in a matrix of fine connective tissue of a granular character, and tending to fibrillation. The cell-elements are a little larger than blood globules, and are distinctly granular in their interior when mature. In the growing part of the node, and immediately in its vicinity where growth is abnormally active, the minute cell elements are seen to be developed in groups within the elongated and enlarged corpuscles of the connective tissue. In form, therefore, the node or gummatous nodule resembles a tubercle ; and by fatty degeneration, or tuberculization, may not be capable eventually of being distinguished from tubercular deposit. How, then, are we to recognise the specific nature of such gummatous nodules ? There is nothing in them so specifically and anatomically distinct that, apart from their history, they can be recognized. The history of the syphilitic case during life is the great guide. The nodes on the shin-bone, or clavicles, have long been recognized as the product of syphilis. It may almost be said that they have been seen to grow under the eyes of the patient and the observer ; and their anatomical characters are found to be such

as compose the gummatous nodules just described. In a case of inveterate syphilis, therefore, whose history is fully known, in whom the node on the shin is characteristic and has been seen to grow, and in whom also we find similar nodules in the lungs or in the liver and in the testicles—symmetrically growing in these latter organs—and consisting of minute cell-elements exactly the same as the node on the shin, it is impossible to overlook the fact, or not to be impressed with the belief, that all of these lesions acknowledge one and the same cause of development—namely, the syphilitic poison—of which they are the expression. The progress of the node is also characteristic and suggestive. Growths of a similar form which result from idiopathic inflammation generally proceed to the formation of an abscess or to the hypertrophy of fibrous tissue. Abscesses are recognized by their pus; fibrous tumours or hypertrophies by the fibre-elements which compose them.

Growths of a form similar to the node which result from cancer are in general to be recognized by the juice expressed from them. In the gummatous nodule we have no juice, and the cell-elements seen in cancer are generally so diversified in their form and mode of growth as not to be easily mistaken. The gummatous nodule is uniform as to the size and form of its cell-elements; and forms growths less highly supplied with blood-vessels than cancers. Cancers also tend to infiltrate and involve neighbouring textures; the gummatous nodule remains isolated and distinct.

By way of elimination, therefore, and by duly observing the history of the case, we are generally able to recognize the nature of such growths, and to assign to them their proper place in pathology.

The gummatous nodule has now been recognized and described in almost all the solid viscera of the body. Symmetrical development is a most constant characteristic. If a node grows on one shin, it is probably also to be found advancing on the other; if found in one testicle, it is extremely probable that it will be seen in the same relative spot in the other. Numerous examples of this symmetrical development may be seen preserved in the Pathological Museum of the Department. During the growth of the nodule, proliferation advances slowly, and a gluey-like material forms which constitutes the inner-cell material of the nodule. If near the surface, such a nodule is apt to melt down, soften, open, and ulcerate; and such a result seems to be associated with other evidence of active constitutional disease, such as exists with a predisposition to tubercle, or with its actual existence. The tumour, however, continues gelatinous and coherent if it is inclosed in a dense part or is deeply seated, as in gummata of the periosteum, scalp, brain, liver, testicle, lungs, and heart, if constitutional disease remains latent or inactive. Fatty degeneration may also eventually occur in the gummatous nodule, and eventually lead to its absorption; or its absorption takes place as a natural process of cure, the changes of which are not exactly known. We know only that the node on the shin-bone not seldom disappears from view and does not return.

I hope from time to time to illustrate by cases and dissections the extensive lesions produced by syphilis; for the post-mortem examinations at the invaliding hospital of the army are extremely rich in syphilitic lesions, most of which are capable of preservation in the museum; and whatever explanation may be given of the fact, it is undoubted that a very large proportion of the cases dissected acknowledge in the history of their illnesses and ill-health that syphilis was the starting point.

For reasons already stated, phthisis must be regarded in many cases as the product of syphilis; and I would fully endorse the statement of Dr. Balfour, from what I have seen in the post-mortem rooms, when he says that a great cause of pulmonary disease among the Guards is the amount of syphilis; which he has not the least doubt is a very fertile cause of its being called into active operation.

Although it is believed that those who enlist are picked men, so far as freedom from actual phthisis is concerned, yet looking to the disproportionate height of the growing lad, as to age and weight which the conditions of enlistment have too often caused to exist, and looking also to the fact that it takes a considerable length of time to observe a man very closely before it can be said that he has or has not a tendency to phthisis, it cannot be said (having a due regard to the ultimate results that appear as to the prevalence of phthisis

in the army) that the men who enlist are so free from the disposition to phthisis as they might be. Their condition of age and height at enlistment, their mode of life, and the fatigue of military duty and drills, tend to develope that predisposition rather than to subdue it. Syphilis, therefore, when it lays hold of such young men has a comparatively easy work to accomplish, and which it often accomplishes with a marked rapidity and with characteristic effects.

The following cases, selected from the records of dissection at Fort Pitt, are mainly intended to illustrate the morbid anatomy of the lung-lesions which are associated with a distinct history of syphilis.

Morton, Sauvages, Portal, Morgagni, and more recently Graves, Stokes, Ricord, M'Carthy, Walshe, Wilks, Virchow, and Munk, have all described with uniformity and distinctness pulmonic lesions in cases of syphilis.

The following are the kinds of lesions which predominate :—

1. *Evidences of Inflammation of the Mucous Membrane of the Bronchial Tubes.*—In such cases, bronchial irritation with fever in many cases precedes the skin lesions, and may disappear wholly or partially when the skin lesions are established. On the other hand, if the syphilitic eruption suddenly disappears, bronchitis may ensue. Walshe records well-marked instances of this; and it is a circumstance to be looked for amongst soldiers who, having recovered from a primary syphilitic sore, are apt to be exposed to the risk of bronchitis when mounting guard soon after being discharged to duty. Secondary symptoms and pulmonic lesions are then apt to date their commencement; and all the general symptoms of phthisis may supervene, and yet no tubercle in the lung may be developed; but chronic bronchitis remains persistent. On this point Dr. Walshe observes, that in the persistence of the general symptoms there "is assuredly enough to create a strong suspicion of the existence of tubercle in the lungs, taken in conjunction with the indubitable tendency of syphilis *plus* mercury to induce the outbreak of phthisis in a person having the requisite constitutional aptitude. How are the cases to be distinguished? By the total want of accordance between the physical signs and the constitutional symptoms; the patient with syphilitic bronchitis has neither consolidation signs, nor, *à fortiori*, the evidences of excavation. But there is a curious source of difficulty which sometimes starts up in these cases, and renders doubt imperative: the infra-clavicular ribs and clavicle thicken from periosteitis and produce dullness under percussion, which cannot with positiveness be distinguished ftom that of tubercle within the lung. Here the observer must wait for events to clear up the diagnosis." (*Diseases of the Lungs*, p. 233.)

2. *The Occurrence of Gummatous Nodules in the Pulmonary Substance.*—These are, in the first instance, of the same histological constitution as the well-known node of the shin, or the sub-cutaneous product described by Ricord, Bärensprung, Virchow, and M'Carthy. They form especially towards the periphery and bases of the lungs. In the former site they resemble nodules of lobular pneumonia. They may soften and be eliminated much in the manner of tubercle, although they may have at first a consistence like scirrhus. It is concerning those which soften in this way that Ricord gives the warning, "not to confound suppuration of a few syphilitic nodules of the lungs with phthisis." Regarding these gummatous nodules, Dr. Walshe observes: "I can find no positive answer to the query, Do these gummata ever form, independently of other tertiary evidences of syphilis in the bones and cellular tissue? If they do, their diagnosis must be infinitely difficult—difficult, indeed, under all circumstances; for the physical signs can be none other than those of solidification followed by softening and excavation, while the local and general symptoms closely simulate those of phthisis." (*Diseases of the Lungs*, p. 431.)

3. *The Occurrence of Gummatous Nodules in various Stages of Growth and Degeneration, associated with the Miliary Deposit of Tubercle.*—In such cases the history of events in the illnesses of the patient may be found to correspond more or less closely with the appearances seen in the lungs—appearances which distinctly indicate the formation of lesions commenced at different dates—appearances which denote the occurrence of lesions in crops, or as a succession of events which may be illustrated by the history of the symptoms during life, or of the illnesses from which the soldier may have suffered.

CASE I.—*Syphilis, nodular secondary Growth in the Lungs and Bones, Iritis, Ophthalmia, Anasarca, Amyloid Degeneration of the Kidney, Death.*

Sergeant John Austin, aged 22 years and 6 months, of the 87th Regiment, had completed 8 years and 10 months of service when he died. He was admitted into Fort Pitt Hospital on the 5th of July, 1861. He had served in India and China, and had no home-service. During his seven years' service in India he had attacks of ague. In August, 1860, he contracted syphilis from a Chinese woman; and about a month after connection he observed a red lump, about the size of a pea, on the glans to the left of the frænum. This lump eventually ulcerated, and presented all the characters of a true Hunterian chancre. The day after he observed this lump on the glans, he noticed a bubo in the left groin; and in a week's time another bubo appeared in the groin on the right side. These buboes were painted with tincture of iodine, and by its means are said to have been "put back." The chancre assumed the usual sloughy appearance, without any disposition to heal, and was burned with nitric acid. Black wash was subsequently applied, under which the sore healed up two months after primary infection, without leaving any induration. Just after the sore had healed he had a sore-throat, which ulcerated; and directly afterwards he observed some red blotches on his arms and legs, which in a short time became developed into *rupia*. He was invalided from Canton in November, 1860, and on the voyage home he suffered from *iritis* (syphilitic) of the left eye and chronic ophthalmia. He improved a little till he reached the Cape of Good Hope, but felt worse during the rest of the voyage. Arriving in England in May, 1861, he was received into the hospital at Portsmouth, where he suffered much with pains in the face and head.

On admission into Fort Pitt Hospital, the integuments of the face and head were thickened and covered with copper-coloured blotches. He had a foul crescentic-shaped ulcer over the right parietal bone, and numerous scars of rupia over his arms and legs. Nocturnal pains in the shin-bones and knees became intensely expressed. The pulse was 100, weak and irritable. Tongue clean, but pale. Pupil of left eye contracted, posterior synechia, cornea hazy, and incipient atrophy of globe. The urine contained albumen, sp. gr. 1·008; and the spleen was slightly enlarged. He vomited an *ascaris lumbricoides*, and passed several feet of tapeworm. The anasarca and syphilitic cachexia slowly but steadily advanced, and he died on the 11th of December, 1861, sixteen months after the primary syphilitic infection.

After death the face was seen to be covered with numerous cicatricial depressions, having a very characteristic pale and bloodless appearance. Patches of rupia were also visible over the legs and body generally. The nasal cartilages were absorbed, and the turbinated bones of the ethmoid destroyed. There was enlargement of the head of the fibula, and nodular gummata on the edge of the patellæ and over the shins.

The lungs generally were healthy, except in the upper lobe of the right lung, where *a single nodular growth existed, of an elastic consistence, involving in its substance specks of a glutinous appearance.*

The abdominal cavity contained a large quantity (over 120 ounces) of serous purulent fluid. The pleural cavities also contained upwards of 100 ounces of fluid.

The acini of the liver were abnormally distinct, and had undergone degeneration (fatty).

The kidneys, together, weighed 14 ounces. They presented considerable cicatricial loss of substance, and the glomeruli had undergone the amyloid degeneration.

Nodes of similar structure to those on the shin-bone and in the lung existed symmetrically in each testicle.

The nodes in the lung, testicles, and the bones, are preserved in the Pathological Museum of the Army Medical Department, now at Netley Hospital.

CASE II.—*Syphilis; Paralysis; degeneration of Corpora Olivaria, ulceration of Uvula, Tongue, and Larynx; nodes in the Lungs and Liver; necrotic centres in the Bones of the Skull; Death.*

Private Henry Tilley, aged 35, of the 37th Regiment, had completed 15 years' service when he died. He was admitted into Fort Pitt Hospital on the

22nd of May, 1861. He had served in Ceylon and Bengal, and was once in hospital with remittent fever. Otherwise his health had been good, although he has had several attacks of intermittent fever. He contracted syphilis in 1845; and the constitutional symptoms were severe. He had sore-throat in 1855. He had been in the habit of drinking large quantities of spirits in India. In 1861 he was invalided from India, mainly on account of chronic varicose ulcer of the left leg. He was sent to duty again in England, when an abscess formed on the outer aspect of the left arm. Whilst in hospital at Penally, in February, 1861, he lost the use of his right arm, leg, and voice. The secondary syphilitic symptoms have been very severe, chiefly affecting by ulceration the scalp and the frontal bone, the uvula, and the tonsils. On admission into the hospital at Fort Pitt, the syphilitic cachexia was fully expressed. The hemiplegia was not preceded by any fits, other than convulsive tremors, which suddenly seized him. Intense headache followed, paralysis of motion and to some extent of sensation supervened on the right side. The face was twisted to the left, and paralysis of the right side subsequently became complete. Irritation of the stomach supervened, with more or less constant hiccough. These symptoms, however, subsided; and movement of the right arm returned. The cachexia, nevertheless, progressed; and he died on the 1st of June, 1861.

Post-mortem examination showed an extensive subcutaneous deposition of yellow, tough, greasy fat. The calvarium was greatly thickened. Circular cicatricial depressions, about the size of a split-pea, and larger were apparent on the outer table of the skull, over the supra-orbital, the occipital, and parietal regions. At some of these spots necrotic portions of bone existed, with some caries.

The cerebral aspect of the temporal bones on both sides was rough, and a white deposit shown through the vitreous plate on the left side. There was some thickening with opacity of the meninges, and especially of the arachnoid at the base of the brain.

In the optic thalami, chiefly on the right side, an irregularly infiltrated yellow degeneration was obvious; but no softening had taken place.

The evidence of deep longitudinal ulcers of the tongue were visible, marked by long and deeply-contracted cicatrices. These cicatrices had a glazed-like appearance on the surface, surrounded by hypertrophy of the papillæ, like condylomatous or warty growths. The uvula had entirely disappeared; a cicatrix, with contraction of the mucous membrane, alone marked its site.

Nodular-globular masses, of a yellowish-white elastic substance, were infiltrated amongst the tissue in the lower lobe of the left lung, mainly towards the periphery; and near the surface at one spot, a nodule was visible through the pleura, and seemed to fill up a number of air-cells. It was surrounded by a considerable zone of increased vascularity; but no softening of pulmonary tissue existed nor deposit of tubercle.

The tissue of the liver was soft, and generally congested, so as to mark out the lobules. A whitish-yellow substance (fatty degeneration) was visible throughout several parts of the parenchyma, extending inwards from the periphery; and there is loss of substance to a considerable extent obvious by cicatricial-like marks on the surface of the liver. Four separate and distinct nodular-globular masses, of a whitish-yellow colour, existed at irregular intervals in the substance of the lobes. Softening had commenced in the centre of one of them, and a considerable amount of white condensed tissue encircled these new growths. These nodular growths varied in size, from that of a split-pea to fully half an inch in diameter. The substance of the liver in their vicinity was considerably altered by congestion, and pigmental degeneration had advanced.

Several of these lesions have been preserved in the museum.

CASE III.—*Syphilis, Phthisis, Pulmonary Tubercles, Gummatous Nodules, Amyloid Degeneration: Death.*

Private William Lamont, aged 24, of 2nd Battalion 1st Royals, had completed 5 years and 11 months of service when he died. He was admitted into Fort Pitt on the 5th of November, 1862, but no history nor abstract of his case has been furnished. He had served in China, and he had syphilis five years ago. In

May, 1861, he suffered from "a pectoral affection," after getting wet on fatigue; and in May, 1862, there was aggravation of the symptoms. The case progressed to death, as cases of phthisis usually do, with occasional hæmorrhages both from the bowels and from the lungs.

Post-mortem examination showed tubercular growths throughout both lungs, and solitary nodular masses were scattered here and there in the substance of both lungs towards the base.

The villi of the intestines were in a state of intense amyloid and pigmental degeneration, with remarkable atrophy of the mucous membranes here and there. The acini of the liver, and the sacculi of the spleen, had undergone similar degeneration.

CASE IV.—*Syphilis, Bronchitis, Nephria, Deposit in the Lung, Amyloid Liver and Cicatricial Loss of Substance, Atrophy with Amyloid Degeneration of the Kidney: Death.*

Private James Slaughter, aged 22, of 2nd Battalion Royal Welsh Fusileers, had completed 3 years of service when he died. He was admitted into Fort Pitt hospital on the 23rd of August, 1861. He had served in England and in Malta. He had suffered severely from syphilis (primary and secondary) in 1859 and 1860. Rupia appears to have been one of the more prominent evidences of the secondary symptoms. In July, 1860, he was admitted into the regimental hospital at Malta, suffering from bronchitis and premonitory symptoms of phthisis pulmonalis. After a month's treatment he was sent to the Sanitarium of Citta Vecchia, where he remained till the end of 1860, when he returned to duty. He continued in apparently good health till the middle of April, 1861, when he noticed his legs swollen, and as the swelling advanced the legs became painful at night. He was re-admitted to the hospital at Malta on the 1st of June, having a pale, waxy aspect, great feebleness of body, and depression of spirits. He was sent to Fort Pitt from Malta, and when he arrived here his lower extremities were œdematous, his face and eyelids swollen and puffy. The urine was pale and copious, having a specific gravity of 1,010, and moderately albuminous. Effusions had taken place into the cavity of the peritoneum and pleural cavities. Early in November symptoms of mania came on, and he died on the 23rd of that month.

Post-mortem examination showed that the lungs were studded with miliary tubercle. In the apex of the right a mass of nodular growth existed of about half an inch in diameter on section, and of a greyish, yellow colour, with a cicatricial puckering of the pleura over the site of this growth.

The minute arteries of the pia mater had undergone amyloid degeneration. The serum in the abdominal cavity contained sugar, as determined by Assistant-Surgeon Wills.

The acini of the liver were unusually distinct, and gave an intensely-deep red reaction with iodine (amyloid). Cicatricial loss of substance was very obvious on the surface of the liver on the anterior aspect of its right lobe, puckered into a sulcus of about an inch in length.

There was also cicatricial-like loss of substance over the cortical substance of the kidneys. Stellate congestion was well marked, and the minute white specks of glomeruli were visible like grains of sand upon the cut surface. These had undergone the amyloid degeneration. The straight vessels (vasa recti) had also undergone the degeneration to an intense degree; and there was a considerable amount of intertubular deposit, consisting of albumen in some form, which resisted the action of ether, potash, and acids, and became granular by boiling.

CASE V.—*Syphilis, Bronchitis, Ulcers, Rheumatism, Hæmoptysis, Phthisis, Amyloid Degeneration: Death.*

Private John Siderfin, aged 26, 37th Regiment, had completed 6 years' service at death. He enlisted on the 17th October, 1857, having a girth of 31½ inches, a weight of 108 pounds, and of a height of 5 feet 5¼ inches. He was by trade a gimp-maker, and of indifferent muscular development. He served in the Mediterranean, East Indies, and at home.

Bronchitis, ulcers, rheumatism, and hæmoptysis are the diseases recorded on

his medical history sheet. His "rheumatic attack" is attributed to the "venereal taint," and it is said to have been cured in *eight* days by iodide of potassium, at Davenport, January 9th, 1862. Afterwards, at Aldershot, in July, he was admitted to hospital for hæmoptysis, attributed to a chill and constitutional predisposition. He was admitted to Fort Pitt on the 22nd November, 1862, suffering from consumption and syphilitic cachexia. There were nodes on both tibiæ, and persistent nocturnal pains. The primary syphilitic sore was contracted in 1857, while serving at Colchester. Soon afterwards he went to Bengal; and on his return to England in June, 1862, he had slight hæmoptysis on board ship, and a syphilitic (secondary) ulcer on the right leg. While at Davenport he suffered much from nodes on the tibiæ and the nocturnal pains of the bones (which morbid conditions were entered in the Returns as "rheumatism"). Spitting of blood, cough, and rapid loss of flesh supervened, and the usual symptoms of tubercular deposits became developed. He remained in hospital from June, 1862, till his death on the 12th of January, 1863.

Post-mortem examination showed that there were small cavities here and there in the substance of the right lung, with tubercle extensively disseminated and infiltrated throughout its substance. One large cavity involves the apex, crossed by numerous trabeculæ. In the upper portion of the left lung the cavities are very numerous, varying in size from that of a bean to large areolar spaces. The left lung weighed 1 lb. 7½ ozs.; the right weighed 2 lbs. 1 oz.

Besides these lesions, there was extensive pigmental and intense amyloid degeneration of the mucous membrane of the intestines, with ulcers of the colon and dysenteric softening of mucous tissue. Interlobular congestion of the liver, with small abscess-like foci were seen on section. These foci contained no pus, but merely softened debris of liver-tissue. The texture generally was soft and flabby, without any increase of vascularity round these softened foci. Characteristic cicatricial-like loss of substance in the left lobe. The liver weighed 5 lb. 7½ ozs.; the spleen weighed 9½ ozs. The Malpighian sacculi were greatly enlarged, the congestion and pigmentation of its substance was excessive, and the reaction of iodine upon the enlarged sacculi was intense. Amyloid and cystic degeneration had commenced in the kidneys, but the former degeneration was only determined by microscopic examination: it was not obvious to the naked eye. The weight of both kidneys was 11 ozs. The cartilages of the ribs were thickened, and those connecting the 4th and 5th with the sternum had undergone yellow degeneration and proliferation of cell elements close to their union with the sternum.

CASE VI.—*Syphilis, Hæmoptysis, Bronchitis, Tubercle in the Lungs and Isolated Nodular Growths: Death.*

Private Andrew Joyce, 41st Regiment, aged 25, had completed 7 years and 9 months of service, and had served in the West Indies, Malta, and in the Crimea. Had been 13 days in hospital at Aldershot, from June 20th to July 2nd, 1861, for primary syphilis; and 12 days, from July 10th till July 21st, for secondary symptoms. In September following he had hæmoptysis while stationed at the Isle of Wight. He ascribed the hæmoptysis to carrying his pack. It recurred, and with symptoms of bronchitis, followed by the rapid growth of tubercles in the lungs.

On enlistment, at the age of 17, he was already 65·5 inches in height, and at death he was 69 inches. In eight years he had grown 3·5 inches, and his chest had increased in circumference 1 inch; his weight had decreased by 33 pounds.

Post-mortem examination showed, in addition to numerous other lesions, that the left lung was swollen to double the volume of the right, and not permeable to air except towards the margins. There were two forms of lesion; namely, (1) a profuse growth of extremely minute isolated granules, of the size of a pin's head, throughout both lungs (miliary tubercle), sparsely spread in the right, but more thickly set in the left; (2) a growth of isolated nodules, about the size of a bean, of a yellow colour, chiefly towards the base, and surrounded by gradually thickening lung-tissue (syphilitic).

The right lung weighed 1 lb. 9 ozs.; the left 2 lbs. 9 ozs.

Besides those lesions, there was fatty heart, and tuberculous ulcers of the intestines.

Granular peripheric nodular growths covered the liver *beneath* its capsule, and the characteristic white cicatricial-like loss of substance was visible on the surface towards the lower margin of the right lobe. The acini had undergone the fatty degeneration to an extreme degree, and there was intense inter-lobular vascularity. There was no reaction with iodine.

CASE VII.—*Syphilis, Gonorrhœa, Gleet, Phthisis, Isolated Nodular Growths in the Lungs: Death.*

Private Michael Maloney (2nd Battalion 11th Regiment, aged 19, of two years' service, all at home), since December, 1859, had been in hospital altogether 108 days for various diseases not stated; but from the existence of the cicatrix of a healed chancre on the penis, taken in connection with the subsequent results, it may be fairly presumed that he had contracted a primary infecting sore. He suffered from gonorrhœa and gleet; and in July, 1860, while under treatment for gleet, the symptoms of phthisis became apparent. He was admitted into Fort Pitt hospital on the 24th October, 1860: he died on the 18th of November.

Post-mortem examination showed the existence of isolated nodular deposits, which studded the substance of the left lung, and the upper lobe was broken up into a cavity. Microscopic examination showed the growth of the minute knots of tubercule amongst the inter-areolar tissue of the air vessels; and the elements of the knots exactly resemble those which may be seen composing the structure of a soft node of the bone—namely, very small nuclei, or very minute cells of an oat shape or oval form.

CASE VIII.—*Syphilis, General Consolidation of the Lungs, with minute Cavities, Cicatricial-like Marks, with Puckered Contractions on the Pleural Surface, Lesions of Skull-bones, similar to those from Syphilis: Death.*

Private Thomas Dickson, 42nd Regiment, aged 29, had completed 4 years' service, all at home. Secondary symptoms of syphilis commenced in August, 1859, in the form of cutaneous eruptions, with sorethroat, and in January, 1861, he had a tubercular eruption over the nose and face, with discolourations in blotches over the trunk and limbs.

Post-mortem examination showed that about one-third only of the left lung was normal, crepitant, and pervious to air, and the lower lobe of the right. Three forms of lesion existed in the diseased portions; namely, (1) general and uniform consolidation; (2) minute cavities, varying in size from a pea to a bean; (3) some cicatrix-like marks, with puckered contractions, on the pleural surface.

Lesions existed in other organs, and the bones of the cranium were characteristic of syphilis.

CASE IX.—*A Preparation in the Museum.*

There is preserved in the Museum a preparation of lungs, which was put up long before these syphilitic lesions in the internal viscera attracted the attention they are doing at the present day. It is of great interest, because it simply tells its tale, unbiassed by any dominant belief. It is numbered 626 in red, and 570 in white coloured numbers, and with the following statement in the catalogue:—"A portion of the left lung, showing on section two isolated nodules, one about the size of a walnut, the other about the size of an almond. The remaining tissue of the lung appears normal. The lung was removed from a medical officer, aged 27, who for several years before death suffered from the cachexia of syphilis. He died from hæmorrhage, after amputation of the arm, necessitated by the sloughing of a carbuncle."

REPORT ON GUN-SHOT AND SABRE WOUNDS OF INVALIDS SENT TO FORT PITT DURING THE YEARS 1860-61.

By Thomas Longmore, Esq., Deputy Inspector-General and Professor of Military Surgery, Army Medical School, Chatham

General Remarks respecting the Cases of the year 1860.

During the year 1860, the number of patients who were admitted and passed through the surgical division of Fort Pitt, labouring under the consequences of *polemical* wounds and injuries were as follows:—

Under Vulnus Sclopetarium	89
„ Vulnus Incisum	5
„ Contractura	5
„ Amputatio	9
„ Cœcitas	1
Total	109

Of the above, 99, under vulnus sclopetarium, amputatio, and cœcitas, were gun-shot wounds, or the consequences of gun-shot wounds; 10, under vulnus incisum and contractura, were incised wounds, or their consequences.

Of the 99 invalids for gun-shot wounds, 3 were admitted twice,* leaving the actual number of individual invalids admitted during the year:—

Under Vulnus Sclopetarium, &c.	66
„ Vulnus Incisum, &c.	9
Total	106

Of these 106 invalids 31 were re-admissions among invalids who had been under treatment in Fort Pitt Hospital before the year 1860, commenced, and had either been discharged to modified duty, or had been sent for change of air to Yarmouth; 26 were of the former class and 5 of the latter. These 31 re-admissions have, therefore, to be deducted in computing the number of *fresh cases* admitted or, in other words, the number of invalids resulting from the campaigns in which their wounds were contracted.

The fresh cases appear thus:—

Vulnus Sclopetarium, &c.	96
Vulnus Incisum, &c.	10
Total	75

The following Table shows the campaigns from which the 75 fresh cases were derived:—

Campaign or Action.	Year.	Vul: Sclop:	Vul: Incis:	Total.
Indian Mutiny ..	1857-9	55	8	63
Beyt	1859	6	1	7
Moultan	1848-9	1	0	1
Moodkee	1845	1	0	1
Chillianwallah ..	1849	1	0	1
Crimea	1855	2	0	2
Total ..	..	66	9	75

* It is necessary to make a clear distinction between the number of admissions which appear in the numerical returns and the number of individual patients admitted. This is not always done, and, when neglected, the omission leads to errors of a serious kind in the conclusions drawn from the returns referred to.

It at first appears strange that the campaigns in some instances should have been so far distant in time from the date when the soldiers who were wounded in them became invalided. This is particularly the case in respect to Moodkee, Moultan, Chillianwallah, and the Crimea, from which battles five admissions occurred. I will briefly refer to the cases of the invalids who had received wounds in these actions, and the lapse of the long intervals adverted to will then be explained.

Moodkee.—One admission. This invalid had remained at duty, notwithstanding contraction of the little finger, and numbness in the course of the ulnar nerve of the left arm, from injury by a musket-ball. He had received two other flesh wounds from musket-balls in the same action. He remained in the ranks until he had completed 21 years' service, and so gained the advantage of securing rather a better pension.*

Mooltan.—One admission. This invalid, Private Samuel Norton, 1st Battalion 60th Regiment, of 17 years' service, had received a perforating wound from a small iron ball on the inner side of the right thigh, and the bone had been grazed. Two pieces of bone subsequently exfoliated. In June, 1857, this soldier received a contusion from round shot on the left tibia, in action near Delhi, and was also wounded on the right side of the head by a fragment of telegraph wire, which material was frequently used as a projectile by the rebels. The cranium was wounded superficially , and the patient was rendered subject to frequent attacks of headache in consequence of this injury. In July 1857, he was wounded by a musket-ball in the back of the left shoulder at Delhi. The bullet lodged, and could not be discovered. The use of the left arm became partially impaired as a result of this wound. But he was chiefly invalided from India on account of chronic liver complaint and broken constitution from long service in a tropical climate.

Chillianwallah.—One admission. This invalid, a soldier of 14 years' service, had received in the battle of Chillianwallah flesh wounds through both legs. They were caused by one and the same ball. He had done his duty in the ranks from the time the wounds were first healed. Latterly the cicatrix, and parts adjoining, of the second wound of exit, that from which the ball was excised, had ulcerated, and this ulceration, from its obstinate character, had led to the man being invalided. The sore became cicatrized, however, in Fort Pitt, and he was again sent to duty.

Crimea.—Two admissions. Neither of these two invalids had been in Fort Pitt before. One case was, singularly enough, a compound fracture of the femur by a musket-ball. The wound had happened to a sailor of the Naval Brigade, in one of the batteries before Sebastopol, and although the man was invalided from the naval service in December 1855, he recovered sufficiently to enlist as a soldier in June 1859. I will allude to this case hereafter (Class 9, Lower Extremities.) The second admission from the Crimean campaign was the result of a shell wound, and the man was invalided on account of repeatep ulceration of the cicatricial structures.

I will now refer to the several classes of wounds, considering those result-

* The above tables and remarks refer only to those wounds, or their consequences, which have been the causes of men being "invalided" from the regiments as unfit for duty. But the wounds of all soldiers passing through the Invalid Depôt at Chatham, when these wounds have been received in action with the enemy, are now separately and regularly registered at Fort Pitt, although the soldiers may be invalided for causes unconnected with the wounds referred to. Thus, in the instance of a soldier who has received a wound, from which he no longer suffers any inconvenience, but who is invalided from an internal disease, as phthisis, or from the effects of long service, his wound is still registered. This is done with a twofold object—1stly, for the information of the Chelsea Commissioners and the benefit of the soldier, whose pension may be increased from the circumstance of his having been wounded in the public service; and, 2ndly, to assist in obtaining a correct and scientific history of the results of campaigns in regard to the injuries inflicted by war. Should the invaliding of the British army be ever carried on under one establishment, a plan which could not but conduce greatly to facilitating business and to increased economy in expenditure, such scientific information as is here referred to may be rendered still more complete than it can be under present arrangements.

ing from gun-shot first. The wounds have been classified according to the Tables in the Medical Regulations (Forms N and O, pp. 161, 162).

Class 1.—Wounds of the Head.

The only injuries of the head from gun-shot admitted during the year were, firstly, a simple flesh wound of the scalp; and, secondly, two cases in which wounds of the scalp were complicated with grazing of bone without depression. The projectiles in all three instances were musket balls. The wounds were healed, and no ill consequences had resulted, but the men laboured under other injuries, which led to their being invalided.

Class 2.—Wounds of the Face.

Three cases of gun-shot wounds of the face, received in action, were admitted. One of these was a Colour-Sergeant of the 1st Battalion, 8th Regiment, who was wounded by a musket ball at Delhi in 1857. The ball struck his left malar bone, penetrated inwards and downwards to the right side, and was excised from the right side of the neck. Some sequestra of the malar bone afterwards came away. Difficulty of deglutition resulted, and continued till the time of the man's discharge. He had completed twenty-one years' service. In a second case, a soldier of the 61st Regiment, Private Charles Southern, of 16 years' service, was struck in the right eye by a piece of shell, at Delhi. Suppuration and disorganization of the eye followed. He was admitted at Fort Pitt in September 1858, an artificial eye was supplied, and he was sent to duty. One year and ten months afterwards he was again admitted as an invalid, with defective power of vision (presbyopia) of the *left* eye. There was no retinal affection. He was also disqualified for service by want of power in the left wrist and hand consequent upon exfoliation of the bone from the lower part of the ulna, and adherent cicatrix. At the same time that the piece of shell had struck the eye, another fragment of the projectile had struck the wrist and injured the bone, and this had led to the disqualification last referred to.

The third case also occurred in a soldier of the 61st Regiment, a man of 16½ years' service, who was wounded at Nuzuffghur in August 1857, by a musket-ball, which entered a little below the articulation of the left lower jaw. According to statement, the projectile fractured the bone, passed backwards and downwards, and lodged in the muscles of the back of the neck. No indication of the fracture of the jaw could be detected at Fort Pitt; the ball could not be felt, nor had any impaired muscular action apparently resulted. The invalid was found fit for service, and discharged to duty.

In addition to the three polemical cases above referred to, there were three other gun-shot wounds of the face treated during the year, two being the result of an accidental discharge of one and the same rifle, the other being autophonic.

The accidental wounds occurred at ball practice on the 18th of July, 1860, to two men, Private William Cotton, and Private John Green, of the 1st Battalion, 4th Regiment. The rifle was fired at a distance of from eight to ten yards from the men wounded. The ball first struck Private Cotton, entering near the right corner of the mouth, in the upper lip, and was split against the lower jaw, which it fractured extensively. The upper jaw was also much injured. The greater part of the ball then made its exit about an inch below the tragus of the left ear, while a smaller portion lodged in the nape of the neck, whence it was excised. The larger portion of the projectile, after its escape, struck Private Green, who was standing near, at the symphysis of the inferior maxilla, and produced a comminuted fracture of the bone. The ball was discovered on the patient's admission at Fort Pitt, lying beneath the skin a little above the pomum Adami. When taken out, it was found to be much flattened out, and, lying near it, a small scale of lead, which had become detached. Extensive necrosis, and separation of many sequestra, occurred in both instances, but eventually complete union of bone and a favourable cure were obtained in each.

The autophonic case was that of Private Edward Stone, 5th Dragoon Guards, who attempted suicide by discharging a pistol under his chin, on the 15th of April, 1860, at Aldershot. The ball comminuted the lower jaw, to the left of the symphysis, fractured the corresponding part of the upper jaw and zygoma, and lodged. On the 2nd of May the cartridge paper was found loose within the mouth; but the ball was not discovered till the 25th of July, more than four months after the wound, when, on making an incision in the cheek to reunite a sinus, it was found embedded in the lower maxilla. Necrosis and exfoliation of portion of the jaw, and of the outer angle of the orbit, occurred, but the vision of the eye was not destroyed. Partial anchylosis of the temporo-maxillary articulation, and consequent impaired power of opening the mouth, led to his being invalided on the 23rd of November, 1860. Strong cicatricial bands within the cheek added to the limitation of the motion. Union of the fractured lower jaw was perfect. This case is another instance of the influence of example in suicidal cases. The day previously to this attempt at suicide, a man of the same regiment, employed on the same duty (regimental police), had destroyed himself by a rifle; and on this occasion the remark was made by Private Stone, "Don't be surprised if you hear the same of me one of these days;" but no attention was paid to it. They were both considered in their regiment to be steady soldiers, of good character and sober habits.

Class 3.—Wounds of the Neck.

Two cases were treated, both presenting features of particular interest.

The first case is that of Private Idem Sands, 1st Battalion, 60th Regiment, wounded at Delhi on the 14th of September, 1857, by a musket ball, which entered just external to the right sterno mastoid muscle, passed outwards and backwards, and made its exit about the margin of the trapezius muscle. The wound is reported to have taken on an unhealthy action, by which the cure was retarded; but, when admitted into Fort Pitt, on July the 20th, 1858, the wound was healed, and, not being thought to be of a disqualifying extent, the man was sent to the depôt of his regiment, to duty. On July the 25th, 1860, he was re-admitted as an invalid from Winchester, on account of inability to use his right arm properly. On examination, there was now found to be marked atrophy of the trapezius muscle, so that the scapula projected from the posterior wall of the thorax more than the scapula on the left side. The long scar remaining from the wound of exit was adherent to the skin and fascia, was tender to touch, and pain was felt shooting up the neck, and along the fore-arm to the points of the fingers. The supra-clavicular fossa became very deep when the arm was elevated, the cicatrix tense, and the scalenus could be distinctly felt, like a sharp ridge. The arm could not be elevated above a right angle with the trunk. Pain and tingling was also stated to be felt in the arm in damp weather spontaneously, and this, and other symptoms, led to the belief of nerve involved in the cicatrix being the source of irritation. The patient had suffered severely from intermittent fever and splenitis at Peshawur.

The second case was one of a ball passing between the trachea and œsophagus, without leading to any permanent lesion in either organ. The patient, Sergeant Joseph Plumford, 42nd Regiment, aged 28 years, was wounded at the attack of the Begum Kotee, Lucknow, on the 11th of March, 1858. The projectile, a round musket ball, entered an inch and a half above the sternal end of the right clavicle, passed behind the trachea, and was excised on the opposite side of the neck, behind the acromial end of the left clavicle. The leading symptoms after the wound recorded, were: discharge of blood from the mouth; aphonia, which lasted for some days; and the usual symptoms referable to injury of the nerves of the brachial plexus.

According to the Sergeant's own statement, there was escape of air by the wound of entrance, indicative of an opening into the trachea, but this is not mentioned in any of the invaliding documents. No disphonia, nor disability connected with the part of the neck wounded, existed at the time of his arrival at Fort Pitt in April 1859; but partial loss of sensation, with depressed temperature of the hand and of all the fingers existed. The hand and fingers were permanently fixed in a straight position; the thumb retained its normal

sensation and mobility. Any attempt to flex the fingers caused great pain in the course of the median nerve. He was discharged to modified service on the 3rd of May, 1859. He was, however, found unequal to this amount of duty, and was finally discharged on the 14th of October, 1860, the fore-arm being generally much wasted, and the middle, ring, and little fingers still anæsthetic, and extended. The forefinger had, in a great degree, recovered its normal power of motion, so that by its means, together with the thumb, he had a grasping power of some useful extent.

Class 4.—Wounds of the Chest.

Altogether there were seven gunshot wounds of the chest, three being re-admissions from among men who had been sent to modified duty. All the seven were wounds by musket balls.

Of the seven wounds, five were circumthoracie and non-penetrating one was penetrating, with the ball supposed to be lodged; and one perforating. Five were from the Indian Mutiny, two from Beyt. Of the cases, five were invalided from the service, two were sent back to duty.

Non-penetrating.—The following are brief abstracts of the cases of non-penetrating wounds:—

1*st Case.*—Private Michael O'Donnell, 78th Regiment, received a bullet wound, on the left side of the chest, in July 1857, at Cawnpore. The ball entered two inches above the inferior margin of the left pectoralis major muscle, and made exit a little external to the spinous process of the 6th dorsal vertebra, on the right side of chest. No professional history of the case was forwarded, beyond the statement, that he had been wounded "through the chest." There appears to have been copious hæmoptysis at the time of the injury, and the man states that hæmoptysis continued at intervals for some time after; but as the ball in its passage injured the axillary plexus, which was evidenced by severe pain along the arm when he was wounded, and anæsthesia of the extremity remaining persistent for a considerable period afterwards, there can be but little doubt that this was a case of a ball making a circuit beneath the integuments. No rib had been injured, and the movements of the bony parietes of the chest remained unimpaired.

The frequency with which non-penetrating gun-shot wounds of the chest are accompanied with hæmoptysis, is well known. This patient was not invalided from India until the year 1859. He then joined the depôt of his regiment at Aberdeen, and was finally sent to Fort Pitt as an invalid, on account of chronic bronchitis and pulmonary emphysema. It was doubtful whether these symptoms were consequent upon or connected with the gun-shot wound. He was discharged from the service chiefly on account of the pulmonary emphysema.

2*nd Case.*—Corporal Taylor Reid, 28th Regiment, of 17 years' service, was wounded by a musket ball at the assault of Beyt, on the 6th of October, 1859. The ball entered in front of the upper part of the sternum, apparently traversed round the left side of the chest, and made its exit posteriorly just above the fold of the axilla. On admission at Fort Pitt, where he came as an invalid from Bombay, he complained of pain around the upper part of the chest, in both clavicular and scapular regions; but, after full examination, no foundation could be detected for these complaints, and he was discharged to duty. No history of the injury was received from the regiment.

3*rd Case.*—This case was of interest, as the history sent home with the patient stated that the wound had been regarded as an undoubted perforating wound of the chest; while its progress, and the state of the chest on the soldier's arrival at Fort Pitt, left no doubt in the minds of any of the surgeons who examined the man, that the ball had only traversed that region external to the pleural cavity, although at the same time it had probably inflicted a severe injury to its contents.

The patient was discharged from Fort Pitt to his duty, at which he still remains.

The case is briefly as follows:—Private John O'Handlon, 28th Regiment, was wounded on the 6th of October, 1859, in the assault on the fortress of Beyt, by a matchlock ball. The projectile entered between the third and fourth ribs on the left side, about an inch external to the mammary line, and

made exit at the inferior angle of the scapula, from which a small splinter was detached. The history sent by the surgeon was as follows: "The ball entered the chest, passed directly through the lung, and emerged close to the inferior angle of the scapula. There was considerable hæmorrhage and hæmoptysis immediately after the injury, and urgent dyspnœa. Cough and febrile excitement were speedily developed. These symptoms remained more or less urgent for a fortnight, with copious muco-purulent and occasional bloody expectoration, and also great discharge of matter, with air bubbles, from the wound in the chest. During this time, while the wound remained anteriorly in a fistulous condition, and evidently communicating with a bronchus, the posterior opening speedily healed up. The progress towards recovery from this time, with the exception of some accessions of fever, was generally satisfactory." The date of healing of the anterior wound is not stated.

This patient was admitted at Fort Pitt on the 26th of August, 1860. He was then in good general health, and the condition of the chest was normal, with the exception of some pleuritic thickening at the neighbourhood of the wound of entrance. It was elicited, in tracing the history of the case, that in this instance also, as in the first case, the axillary plexus had been injured by the passage of the ball, and the admitting medical officer notes, on the invalid's admission at Fort Pitt: "He complains of uncomfortable feelings down the arm, but the motions of the joints are almost perfect." The ribs in the neighbourhood of the wound of entrance were uninjured, and the cicatrix of the wound itself was not deeply puckered, or adherent, as would have been the case had there been direct communications with the lung; and when the short time within which the posterior wound is described to have become closed is considered, there can be little doubt but that the ball had made a circuit external to the pleural cavity, and had not passed through the lung. This was confirmed by observing the probable direction the ball would take when the man placed himself in a position similar to that in which he was with regard to the enemy at the time he received the shot.

The discharge of matter with air bubbles from the anterior wound is quite reconcilable with the usual condition of the fistulous track of a gun-shot wound external to the chest, while sloughs are being detached: had there happened to have been forcible expulsion of air at each *expiration*, which is so strongly marked a symptom in a perforating wound communicating with a bronchus, a different diagnosis would have been necessary. Hæmoptysis, dyspnœa, supervention of pleuritis, are well known to be frequent accompaniments of gun-shot wounds of the chest, when no penetration deeper than the external parietes has occurred. The case was instructive, from the widely different nature of the diagnosis deduced from a study of its symptoms, and the condition of the chest, on the arrival of the patient at Fort Pitt, from what was formed of it when first treated; and more especially, because observation leads to the belief that gun-shot injuries to the chest *without penetration* are by no means unfrequently reported to be *penetrating* wounds, from the presence of symptoms which are really common, under certain circumstances, to both classes of injuries.

Examination after death occasionally affords an opportunity of demonstrating what close investigation is necessary for forming an accurate diagnosis of chest wounds. In the Annual Report of the 90th Regiment, for the year 1857, which includes the period of the siege of Lucknow, the following remark occurs by Surgeon Home, V.C.:—"I saw all the symptoms of a gun-shot wound of the lung, including copious spitting of blood, and intense dyspnœa, with subsequent inflammation of the lung, in a case where, after death, I ascertained that the bullet had simply coursed *outside* the chest, fracturing the scapula and one rib. I could not make out that any spicula even had penetrated the pleura. The case occurred in one of the native regimental followers." On the other hand, I may call attention to a very instructive preparation which has lately been added to the pathological collection, in the museum of the Army Medical Department, which shows a *perforating* wound of the left lung, where several symptoms, usually described as of necessity present in such injuries, were absent. The preparation presents a widely lacerated circular perforation, near the base of the lung, which is greatly shrunk in size, from the effects of compression. The wound was caused by an irregular gingall

ball, about one inch in diameter. The ball entered near the left mamilla, and made its escape by an opening one inch to the left of the spinous process of the ninth dorsal vertebra. The patient, Ensign ——, lived for twelve days after the injury; and chiefly from the absence of the symptoms of hæmoptysis, and of any marked dyspnœa, a medical officer of experience was led into the mistake of assuring the colonel commanding this officer's regiment that the lung had escaped from being wounded. Such apparent anomalies in the characters of these wounds are readily explicable on proper investigation.

4th Case.—Non-penetrating.—Ball reported to be lodged. Private Thomas Johnstone, 75th Regiment, aged 22 years, was struck by a musket ball in the chest, at the siege of Delhi, on the 8th of June, 1857. According to the history forwarded with this soldier, by the surgeon of the regiment, "the ball entered the thorax near the sternal articulation of the left second rib, and has since remained in the cavity of the chest."

The most prominent symptoms, after the wound, are described to have been great dyspnœa, and feeling of suffocation; bubbles of air were forced through the wound, and blood in considerable quantities was brought up, in fits of coughing. Nine days after the wound he was sufficiently recovered to be removed to Meerut. The wound healed, but he suffered from dyspnœa, and was invalided to England, and arrived at Fort Pitt on the 27th of April, 1859. He was then carefully examined by Surgeon Major Matthew, who arrived at the conclusion that the ball had most probably struck the sternum, and glanced off. The soldier at this time experienced but little inconvenience from the injury, and was sent to duty with the depôt of his regiment. He remained at duty until the 3rd of August, 1860, when, in consequence of hæmoptysis, he was admitted into his regimental hospital, and subsequently again sent as an invalid to Fort Pitt. He was admitted on the 9th of September, 1860. On examination of the chest, dulness on percussion was strongly marked in both clavicular regions, especially on the right side, and there were the other usual signs of tuberculosis. The patient was generally debilitated. The cicatrix of the wound of entrance was depressed, but not deeply puckered or inverted. The phthisical symptoms were most strongly marked on the right side, while the wound had occurred on the left, and there seemed to be little reason for associating the phthisis under which the man now laboured, and for which he was discharged from the service, with the gun-shot wound.

5th Case.—The following case of gun-shot wound of the chest also led to difference of diagnosis as to its nature. It was most probably a *non-penetrating* wound, with lesion of the pectoral contents by contusion, complicated with a phthisical diathesis. The invalid was Thomas McHugh, 1st Battalion 5th Regiment, aged 32 years, of 13 years' service. He was wounded by a musket-ball at Omreah, in Oude, on the 2nd of December, 1858. The surgeon, who forwarded an abstract history of the case, gave the following particulars:—"Private McHugh received a severe wound of the chest, penetrating under the left axilla, and wounding the lung. The ball lodged. He suffers from frequent attacks of dyspnœa. General health debilitated. Is unable to wear his belts and march at quick time in the ranks." He was invalided from India, and admitted at Fort Pitt, in April, 1860. Surgeon-Major Matthew then remarked, "The ball struck him three inches external to the inferior angle of the scapula, and appears to have passed backwards, striking the edge of the scapula, and glancing from it." A small piece of bone came away from the situation, about six weeks after the wound. Moreover, the position the patient was in, when he was struck, relatively to the fort from which the ball was fired, showed that the ball must have passed backwards, and could not have entered the chest through the axilla. The projectile was apparently diverted by striking the angle of the scapula, and probably became lodged in some part of the spinal muscles. The dyspnœa was no doubt chiefly due to the development of phthisical symptoms, which were of constitutional origin, as there was evidence of tubercular softening in the apices of both lungs.

6th Case—Perforating.—Private Thomas Powell, 9th Lancers, was wounded at Delhi, in the right side of the chest, on the 14th of September, 1857, by a musket ball. The projectile entered between the second and third ribs, an inch and a half below the sternal end of the clavicle, and passed out posteriorly through the right scapula, beneath its spine. The injury, according to Surgeon

Todd, 9th Lancers, was followed by violent inflammation of the lung. It was elicited from the patient that the wound was accompanied by hæmoptysis, which continued for some time; that blood, mixed with air, escaped from the front wound; and that several fragments of bone were removed from the posterior wound during the progress of cure. He arrived as an invalid at Fort Pitt, in June, 1859, and upon examination pleuritic thickening of the upper part of the right side of the chest, and some limitation in expansion as compared with the left side, were detected; but the man's general health was good, and the wound not being supposed to be of a disqualifying extent, he was sent to try duty at his depôt. He was found unserviceable by the regimental authorities, chiefly on account of dyspnœa, was again invalided in February, 1860, and ultimately discharged from the service. The force with which the ball appears to have wounded this patient, the projectile passing directly out, and the symptoms, though only very briefly recorded in the medical history from India, seemed to point to the conclusion that the lung had been traversed. If so, it is an additional example of the greater frequency of recovery from penetrating wounds of the apex,—like those of the periphery of the lung—where also vessels are of small calibre,—as compared with wounds of those parts of the organ which more nearly approach the larger ramifications of the vessels at its root.

Order 5, Perforating.—There was some doubt respecting the true nature of the following case. The injury led to extensive abscesses external to the chest, and the effects of these, together with the supervention of phthisis in both lungs, led to the patient's discharge from the service. It has been classed as a perforating wound of the chest, in accordance with the report of Surgeon Laing, 23rd Regiment, who forwarded an abstract history of the case, as follows :—

"Sergeant James Dawson, 23rd Regiment, received a gun-shot wound at the siege of Lucknow, in March, 1858. The ball entered in front, above the clavicle, passed completely through, injuring the upper lobe of left lung, rib, and scapula. Great constitutional disturbance ensued, complicated by the intercurrence of endemic fever. Some pieces of bone (fragments, apparently, of scapula) have been removed, and others are still likely to come away. Disqualified for military duties by loss of power of left arm."

On the invalid's admission into Fort Pitt, on the 2nd September, 1859, the cicatrices showed that the ball had entered 1½ inch above the left clavicle, and had made its exit just above the spine of the scapula, on the same side. The following remark was made at the time by Surgeon-Major Matthew :—"It is difficult to see how in this case the ball could have injured the lung. The posterior opening is now healed, but the anterior one is still open, and this wound contains a small portion of dead bone." Mr. Matthew concluded it to be a "perforating wound of the neck, with contusion of rib." The patient remained under treatment in Fort Pitt for nearly three months, and was discharged on the 5th December, 1859, to modified duty. On the 23rd of September, 1860, he was re-admitted, being found unfit even for modified duty. He was then in a very reduced state, and stethescopic examination showed advancing tuberculosis of both pulmonary apices. There was great thickening of the integument in the supraclavicular region, where a succession of abscesses and sinuses had occurred. There was also much induration of the subcutaneous tissue over the left scapula, and an open unhealthy sinus existed under the inferior angle of the scapula. A cicatrix also existed over the twelfth rib, showing that pus had found its way beneath the integuments to this spot. The scapula was bound down to the chest by adhesions, so that the movements of the arm were greatly impeded. He was discharged from the service on the 30th of October, 1860.

Class 5.—Wounds of the Abdomen.

No case of this class was admitted during the year.

Class 6.—Wounds of the Back and Spine.

Only one case of this class occurred. The cervical portion of the spine was involved in the instance referred to. Private Benjamin Ritchie, 78th Regiment, was struck in September, 1857, at Lucknow, by a musket-ball, which entered

the left side of the neck, on a level with the hyoid bone, an inch external to the median line. It passed backwards, and lodged apparently somewhere in the neighbourhood of one of the upper cervical vertebræ. Immediately on the receipt of the wound, he fell down, having lost all control over his limbs, and expectorated a quantity of blood, both at the time and at intervals after falling. The upper and lower extremities remained paralyzed and anesthetic for a fortnight, when he gradually recovered the use of his limbs. He was invalided home, and admitted into Fort Pitt in April, 1858. At that time he could not move his head laterally, except to a small extent to the left side; but kept his head bent forward towards the chest. In consequence of this position, the spinous processes of the sixth and seventh cervical vertebræ projected more than was normal. An incision was made, on the supposition that the ball might be lying in this situation; but it could not be found. The man was retained above two months under observation, but all attempts to discover the site of the ball failed. Eventually he was sent to duty with his depôt, the injury not having been regarded as disqualifying. He was re-admitted, however, on the 1st of October, 1860. There was no improvement in the man's condition at this time; but, on the contrary, absorption seemed to be going on in the bodies of the fourth and fifth cervical vertebræ, the spinous processes of which were now also projecting. There was, also, difficulty of deglutition, and pain on pressure on the left side of the projecting cervical vertebræ. The inability to straighten the neck continued, and he was unable to bear any weight upon his head. The invalid was consequently discharged from the service. Had the ball lodged in the body of the fourth or fifth cervical vertebra in this case?

Class 7.—Wounds of the Perinœum, &c.

None admitted.

Class 8.—Wounds of the Upper Extremities.

Twenty-seven cases of gun-shot wounds of the upper extremities were admitted during the year. Six of these were of Order 1, or "simple flesh contusions and wounds; seventeen of Order 4, "with compound fractures of one or more long bones;" one of Order 5, "with compound fracture of carpus and metacarpus;" and four of Order 6, "dividing and lacerating the structures of the fingers or thumbs." The wounds of Order 1 were chiefly of interest on account of their consequences, viz.: contractions or atrophy, causing the men to be invalided to Fort Pitt. The axilla was the part injured in two instances. In one case—that of a sergeant of the 90th Regiment, at Lucknow—a musket-ball passed through both folds of the axilla; but, though numbness and loss of power of the arm resulted as an immediate effect of the injury, these symptoms gradually subsided. While under treatment in India for the wound, contraction of the elbow-joint occurred from disuse, and he was invalided home on this account. After admission at Fort Pitt he was placed under chloroform, the contraction reduced, and he was discharged for duty with the motion of the elbow-joint nearly perfectly restored. In the second instance, the posterior fold of the axilla was struck by a piece of timber detached by a round shot, in July, 1857, at Lucknow. The insertions of the latissimus dorsi, terves major, and long head of the triceps muscles, appeared to be chiefly injured by the contusion. Adhesions, leading to contractions, were established; and loss of power of elevating the arm from the side led to the patient being invalided and discharged from the Army in March, 1860.

The third case of this order also presented features of interest. A private of the 52nd Regiment was wounded at Delhi, by a musket-ball through the left deltoid muscle. The humerus was apparently uninjured. He was invalided home on account of general loss of power in the arm. The history forwarded with the patient did not afford further details. On admission into Fort Pitt, the deltoid muscle was found to be atrophied in its central portion, being firmly bound down to the humerus on each side of the bicipital groove. The groove itself could be distinctly traced by the finger. The bicipital tendon was firmly bound down in the groove, there being no movement of it when passive motion of the arm was made. This mechanical impediment to the play of the tendon had led to atrophy of half the belly of the biceps muscle. From the

lesions described, there resulted partial inability to flex the fore arm upon the upper arm, and also loss of deltoid power of elevating the humerus. This latter was in some degree compensated by increased development of the upper portion of the trapezius muscle on the same side. This soldier was sent to the depôt of his regiment, and recommended for modified duty ; but not retained. He was ultimately discharged from the army in October, 1860.

In each of the two remaining cases of this Order, a musket-ball had passed through the interosseous space of the fore arm. The injury had led to contraction of the elbow-joint and wasting of the brachial muscles in one instance, and to contraction of the middle and ring fingers in the second. Both soldiers had to be discharged from the service in consequence of these contractions.

The sixth was a simple flesh wound in the upper arm and calls for no remark.

The situation of the compound fractures (which were all instances, with one exception, of complete fracture) in the seventeen cases of Order 4, of this class, is shown in the following table :—

Humerus	9
Humerus and Scapula	1
Radius	1
Ulna	3
Scapula	1
Clavicle	1
Clavicle and Scapula	1
Total	17

All these injuries were caused by musket balls, with the exception of one which was caused by a fragment of shell. This was the case in which there was only partial fracture. The piece of shell entered and lodged near the insertion of the deltoid muscle ; at the same time breaking off several splinters of the bone, which were removed. An adherent cicatrix resulted, and pain was caused on elevating or rotating the arm. There was no wasting of the muscles, and the pain complained of appeared to be exaggerated. This patient was dismissed to modified duty ; but sent back, and eventually discharged from the service.

The usual causes of invaliding in these injuries were loss of power in the extremity—resulting firstly, from injury to nerves, inducing loss of sensation, atrophy, and contractions ; or secondly, from binding down of muscles and other tissues by firm adhesions in consequence of the inflammation attendant upon the original wounds, or from cicatricial adhesions to bone after the removal of necrosed sequestra ; or, thirdly, from anchylosis of joints, when the fractures occurred near the articular extremities of bones. In one instance only—in one in which the fracture occurred in the clavicle—was the discharge of the patient from the service due to non-union of the fractured bone.

One case afforded an example of fracture, and at the same time splitting of the ball and injury in a double direction. Sergeant S. St. John, a healthy young soldier of the 28th Regiment, was wounded at the storming of the Fort of Beyt, on the 6th of October, 1859, by a musket-ball, which struck him on the ulna of the right arm, about four inches below the olecranon. He was loading his musket at the time he was hit, so that the bent position of the arm explained the injuries which followed. The ball fractured the ulna, and was itself also split into two parts ; one section of the ball passed out close to the external condyle of the humerus, apparently injuring the capsule of the joint in its passage ; the other section, running up through the soft parts, passed out about five inches above the elbow. Great inflammation, both of the joint and of the upper arm, followed. Amputation was several times contemplated, in consequence of the profuse suppuration and impairment to general health with which it was accompanied ; but eventually the sergeant recovered with anchylosis of the joint and some wasting of muscles. He retained fair power of moving the fingers.

One case, in which the humerus was fractured three inches and a half below the acromion-process of the scapula, near the insertion of the deltoid muscle, was accompanied with contusion of the chest and also of the lung, evidenced by hæmoptysis at the time of the injury. The ball, after fracturing the humerus,

passed through the axilla, bruising the brachial plexus, and causing numbness of the arm and hand, and emerged through the scapula, near its inferior angle. Impaired power of raising the arm from muscular contractions, and binding down of the scapula by adhesions, were the causes for which this soldier was invalided. All paralysis had disappeared, and stethoscopic examination showed that the condition of the lung which had been injured was everywhere normal at the time of the invalid leaving Fort Pitt.

In another instance, an ordinary musket-ball injury of the scapula was followed by such close adhesions of the sub-scapular muscle to the walls of the chest, that certain movements of the corresponding extremity were greatly impaired; so much so, as to unfit the patient for the duties of a soldier.

The instances of wounds in which the bones of the hand and fingers were involved do not call for special remark. When once a soldier has been wounded in these situations, it can rarely happen that the practice of conservation will leave the patient capable for the duties of a soldier, however favourable, in a surgical point of view, the result may be. This is especially the case in wounds of the right hand. The fascial contractions and thecal adhesions which usually follow such injuries, even under the most favourable circumstances of union, sufficiently explain the consequence described. In one of the instances included in this number, the invalid suffered from constant wearing pain in the course of the ulnar nerve, after amputation of the little finger. The pain was so great and the irritation so constant, by day and night, slight as its origin appeared to be, that the patient was greatly reduced in general health. The cicatrix was opened, and a portion of it, suspected to be the part in which nerve was involved, from its special tenderness, was excised. The result was most satisfactory, for total relief from the pain followed. On examination by the microscope, it was ascertained that the part excised consisted chiefly of nerve-fibre enclosed in cicatricial tissue.

Class 9.—Wounds of the Lower Extremities.

The number of admissions for injuries of the lower extremities was nearly the same as the number in the upper extremities, viz., 28. Of these, 21 were admitted for the first time at Fort Pitt, and 7 were re-admissions. Of the 7 re-admissions, 4 were men who had been sent to try modified duty, and 3 were patients returned from the Convalescent Hospital at Yarmouth.

The following is the distribution of the 28 cases of this Class, according to the Orders of Inspector-General Taylor's Classification:—

Order 1. Simple Flesh Contusions and Wounds ..	17
„ 2. Contusions with Partial Fracture	1
„ 4. „ with Compound Fracture ..	8
„ 5. Penetrating Tarsus or Metatarsus	2
Total	28

The following shows the distribution, according to the regional divisions of the lower extremity wounded:—

Thigh	13
Leg	12
Foot	3
Total	28

The simple flesh wounds require little remark. One of them affords an instance of lodgment of the ball for 17 months, at the expiration of which time it was discovered and extracted

One case of a bullet wound, followed by sloughing, presented features of interest. Private James Cosgrave, of the 93rd Regiment, was struck by a bullet on the outside of the right thigh, at the taking of Lucknow, on the 11th of March, 1858. The ball passed through the muscles, but at the same time drove in before it the barrel of his uniform sporeen, or purse. Mortification (hospital gangrene?) followed, extending so deeply as to expose the bone, a layer of which exfoliated. He was invalided in consequence of the loss of muscular substance in the external vastus and crureus muscles, in which there

was a deep, but not adherent, puckered cicatrix, 3½ inches long by 1¼ inch broad. Contraction of the knee had been induced by preponderant action of the flexor muscles.

In a second case, occurring in Private James Hogan, 64th Regiment, in which sloughing had followed a bullet wound nearly in the same situation, at Lucknow on the 16th of November, 1857, the patient was detained in hospital at Fort Pitt and Yarmouth for sixteen months, by obstinate ulceration at the seat of injury. The sore ultimately became cicatrized, and although there was some loss of substance and stiffness of the limb, the man was supposed to be capable of light duty, and discharged with this view.

Atonic ulceration of an obstinate character also existed in a third case, that of Private F. Whittaker, 34th Regiment, in which a wound from grape-shot, received at Cawnpore on the 28th of November, 1857, in the calf of the right leg, had been followed by extensive sloughing. This patient was two years under treatment in the Convalescent Hospital at Yarmouth; but all remedies, including the use of actual cautery, failed to induce healthy action in the sore.

In another case of simple flesh wound, the same ball had passed through both thighs, at their posterior aspect.

In these flesh wounds, the causes of invaliding were chiefly contractions following cicatricial adhesions, loss of muscular power, or neuralgia consequent upon injury to nerves. In some instances the complaints, especially as regards pain, may have been to a certain extent exaggerated. Army Surgeons frequently meet with very great difficulty in arriving at a just conclusion as to the real amount of disability which exists in these cases, for it is the object of the soldier to quit the service, and to have the advantage of the pension which is invariably given to a man disabled by a gun-shot wound received in action. In the following case there seemed no doubt of the reality of the symptoms complained of. Private Thomas Hemmingham, of the 1st Battalion, 20th Regiment, was wounded by a musket ball in the middle of the right thigh, immediately over the sartorious muscle. It passed directly backwards, and was excised from the posterior aspect of the limb. The wound cicatrized without any special symptom. The patient suffered from neuralgic pains down the inner aspect of the thigh and leg, as low down as the ankle. He compared the pain to a succession of sudden smart shocks, particularly on the occurrence of changes of weather. The symptoms were supposed to be attributable to injury of the saphenous nerve, or to its having become, perhaps, involved in the cicatrix of the wound.

The case of Order 2 was one in which the internal malleolus of the right leg was grooved by a musket ball at Delhi, in September 1857. The cicatrix was adherent to the bone, in which a depression, indicative of loss of substance, existed. The internal structure of the joint itself was not affected, but its mobility was impaired, by the contraction of its cicatrized integuments.

In the 8 cases of Order 4, viz., those complicated with compound fracture, the situations were the following :—

Trochanter Major	1
Shaft of Femur (upper third)	1
,, ,, (lower third)	1
Head of Tibia	1
Shaft of Tibia	2
Shaft of Fibula	1
Tibia and Fibula	1
Total	8

In the case in which the trochanter major was injured, the bullet had fractured the process superficially. Exfoliation had followed, but the wound was cicatrized on his admission into Fort Pitt. There was wasting of the glutœal muscles on the same side, and the patient laboured under such impaired power of rotating the thigh outwards, that he had to be discharged from the service.

The case of gun-shot fracture of the femur in the upper third occurred in Private John Ashworth, 53rd Regiment, who was discharged to modified duty from Fort Pitt, on the 6th of September, 1858. His case will be found recorded

among the ten cases of gun-shot compound fracture of the femur with recovery in the Army Medical Reports for 1859, page 319. In that record it was inadvertently stated that this patient was discharged to pension in July 1859. He remained at modified duty until November the 13th, 1860. When invalided at this date, he complained chiefly of suffering great pain on exertion, but there were no obvious reasons to justify this complaint. The muscles of the limb were well developed, and it is probable the symptoms were exaggerated for the purpose of escaping from further service.

The next case, one of compound fracture of the femur in the lower third, was alluded to at the commencement of this part of the Report, under the heading "Crimea." Several points of interest are presented by it, and I, therefore, give it in detail.

Private Phillip Cooper, 58th Regiment, aged 27 years, was invalided from Sheffield, in consequence of inability to march, the result of a gun-shot wound. This invalid was wounded by a rifle shot whilst in the Naval Brigade before Sebastopol, in September 1855. The injury produced was a comminuted fracture of the lower third of the femur of the right side. The ball passed in at the inner and anterior surface of the thigh, three inches above the knee-joint, and passed out in an oblique direction at the outer and posterior portion of the limb, about an inch below the level of the wound of entrance. He was in hospital upwards of two months, during which time several pieces of bone came away. In December of the same year, the wound of exit was still open, but the bone had become united, so that he could bear the weight of his body on the limb. He was then discharged from the naval service. In June 1859 he had so far recovered, that he was able to enlist in the 58th Regiment. He, however, states that, during the interval between the date of his discharge from the Naval Brigade and the time of his enlistment in the army, he had been obliged to go into the Middlesex Hospital, where he underwent an operation. The bone was cut down upon, and several dead pieces were taken away. The wound soon healed, and he felt no inconvenience from it whatever until July 1860, a year after his enlistment. He then began to feel pains in the limb, which he attributed to rheumatism. This pain was increased after marching, and he states he had to fall out on many occasions. He continued to suffer from a feeling of stiffness in the knee, the pain during walking became increased, and at last he was obliged to go to hospital. At the time of his admission into the regimental hospital, he was suffering from great pain in the limb, general swelling of the thigh, rigors at night, loss of appetite, thirst, and all the usual evidences of the formation of a deeply seated abscess. The posterior wound after a time opened, and the discharge of some unhealthy pus, which followed, gave him relief from the constant pain he had been enduring.

On the man's admission at Fort Pitt, on the 31st of October, 1860, the wound had been open three months, and its appearance led to the supposition that a portion of dead bone was becoming detached, although none could be felt on examination by the probe. An adherent cicatrix, 5 inches in length, and 2½ inches in breadth, existed on the inner aspect of the thigh, apparently the result of the incision made at the Middlesex Hospital. There were several openings anteriorly, situated about the junction of the lower and middle thirds of the femur, and towards the inner side. The man was of a strumous diathesis, and, according to his own account, his mother and several of the family had died of consumption. He was found unfit for service, and discharged as an invalid on the 5th of December, 1860.

This case was felt to be especially worthy of notice, while the invalid was at Fort Pitt, not only as an instance of recovery after so serious an injury as a gun-shot fracture of the femur by a rifle bullet, but also from the fact of the man having been passed as a recruit notwithstanding the evidences of the cicatrices of the wound, and of the incision made for the removal of the necrosed bone. Since his discharge from the hospital, I have had a conversation with the medical officer who passed him for a recruit, and the circumstance of his being accepted for a soldier, which was inexplicable before, at once was rendered clear. The disability had not been overlooked ; but, at the urgent request of the Commanding and some other officers of the regiment, the medical officer had been induced to pass him, on account of his value as a

cornet player for the band. Promise was at the same time made that he should be relieved from carrying a knapsack, or from any exercise which called for more than the most ordinary exertion. It is a striking example, however, of the fruitless result of making any compromise of the kind in the medical province of the duty of recruiting.

Head of Tibia.—The case in which the head of the tibia was wounded occurred at Delhi, in June 1857. The ball first struck the bone near its tubercle, and was then deflected round its head upwards and to the inner side, and made its exit at a distance of 3 inches from the wound of entrance. The surface of the bone was grooved by the projectile. The joint was unopened, but inflammation of the synovial capsule had followed, and impaired power both of flexion and extension resulted. All movements of the joint were accompanied with a remarkable amount of sound like the creaking of new leather.

Shaft of Tibia.—One of these cases is worth notice from the situation in which the ball became lodged. The wound occurred in Private James Kerry 2nd Battalion Rifle Brigade, in Oude, on the 12th of April, 1859. He was struck by the ball in the middle of the right tibia. The bone was fractured at the part struck, and the ball lodged. Four months afterwards the ball was discovered near the insertion of the tendo-Achillis, in the hollow space between it and the calcaneum, and was excised from this situation. Union of the fractured bone was effected; but the patient suffered afterwards from necrosis of the tibia and consequent lameness.

Shaft of Fibula.—Some of the complications of this wound render it worthy of notice. Private James Ryan, 1st Battalion 13th Regiment, while on sentry at Allahabad, on January the 28th, 1858, was wounded by a musket ball, which passed through the calf of the right leg, just below the fleshy part of the gastrocnemic muscles. In making its exit it inflicted a partial fracture of the fibula. The wound healed, but was followed by severe neuralgic pain, probably from the perineal nerve being involved in the injury. This pain continued to distress him at intervals up to the time of his discharge from the service. Contraction of the muscles of the calf, and persistent extension of the foot, ensued in the course of cicatrization of the wound. To remedy this defect, the tendo-Achillis had been subcutaneously divided before the invalid arrived at Fort Pitt, but he remained disabled in consequence of loss of power in the foot and ankle-joint, and from general wasting of the muscles of the limb.

Tibia and Fibula.—This case presented no peculiarities.

Order 5, Wounds of the Foot.—In one of these cases considerable difficulty was experienced in extracting the ball, which was deeply and firmly embedded in the astragalus of the right foot. The extraction was finally effected by means of a "screw tire-balle." Surgeon Marlow, M.D., who forwarded a report of the case, wrote as follows:—"It was found impossible to extract the ball by ordinary means. Fortunately an instrument made by Savigny, in the form of a screw, with a silver canula, was procured, and passed down upon the bullet, The screw wormed its way into the lead without the employment of any power, took a firm hold, and but for the extreme tightness with which the projectile was held, would have extracted the ball altogether. The great force found necessary for overcoming this resistance, however, drew the instrument out of the lead; but, in doing so, the bullet was lifted out of its bed, and thus was afterwards capable of being extracted without much difficulty." The injury occurred in Private Peter M'Cormack, 28th Regiment, at the assault on the fortress of Beyt, in 1859. Considerable local inflammation and constitutional irritation followed, but the foot was saved with partial stiffness of the ankle-joint and wasting of muscles.

In the second case, the ball passed through the metatarsus, fracturing the third and fourth metatarsal bones. The fractures became united, and the wound ultimately cicatrized, but considerable tenderness of the plantar surface remained.

Class 10.—Wounds of the Larger Arteries.

No wounds of this class were admitted.

Class 11.—Wounds with Direct Penetration or Perforation of Joints.

Two cases have been returned under this class, but both appear to admit of doubt as to the classification having been correct. The first case is that of Private George Dudley, 53rd Regiment, who was wounded in Oude, on the 27th of April, 1859, over the right ankle joint, it was supposed, by a musket ball. The following remark is taken from the history of the case forwarded from India :—"The wound was for the most part only a contusion of the skin, but there wsa a small irregular opening, through which, apparently, a jagged piece of metal had passed, and from which synovial fluid exuded in considerable quantities."

Surgeon Major Matthew, who saw this soldier when admitted into Fort Pitt, in March, 1860, concluded that the joint had probably not been opened, but that the synovia referred to had escaped from the sheath of one of the external tendons, to which the cicatrix was still adherent. The patient asserted the joint was stiff and painful, but there was no evidence to confirm this, and the man was discharged to regular duty, which he has since continued to perform.

The second case was stated to be a gun-shot wound through the left elbow. The history sent with this patient was very meagre, and the fact that penetration had really occurred, when the joint was injured, did not appear to have been established by any proof. Partial anchylosis of the joint, wasting of the muscles of the forearm, and loss of power of the hand, resulted in this case.

Class 12.—Wounds of Nerves, unconnected with Fracture of Bone.

Four of this class have been admitted ; in one case, the sciatic nerve, and in three others, branches of the anterior tibial nerve, were the nerves injured.

Wound of the Sciatic Nerve.—Private John Ralph, 28th Regiment, was wounded at the attack on Beyt, in 1859, by a musket ball, which entered near the fold of the left natis, just below the level of the coccyx. The ball lodged, and the seat of lodgment could not be detected. The symptoms disabling this soldier were wasting and loss of power in the left lower extremity, occasional severe cramps and shooting pains, in the course of the sciatic nerve, and its branches.

Anterior Tibial Nerve.—The following are brief reports of the three cases under this head :—

Case 1.—Private Edward Brennan, 88th Regiment, aged 23 years, was wounded at Cawnpore, on the 29th November, 1857, by a musket ball, which entered the cente of the posterior aspect of the calf of the right leg, passed forwards through the interosseous membrane, between the tibia and fibula, and made its exit in front. Numbness, coldness, and œdema of the foot, wasting of the muscles of the leg, and constant pain in the neighbourhood of the wound, aggravated on changes of weather, were the consequences of this injury, and caused the soldier to be discharged from further service.

Case 2.—Private Edward Pearcey, 53rd Regiment, was struck through the calf three inches below the popliteal space, and just behind the fibula of the right leg, by a musket ball, at Delhi, in July, 1857. The bullet passed through the interosseous membrane, and escaped in front. Numbness of the dorsum of the foot, and inability to bear pressure of the body in walking, stiffness and difficulty in flexing the foot, general wasting of the muscles of the leg, were the symptoms presented, on the man's admission at Fort Pitt. He was discharged as an invalid.

Case 3.—Private James Mullin, 32nd Regiment, was wounded at Lucknow, on the 13th of July, 1857, by a musket ball, which entered the popliteal space one inch to the inner side of the outer ham-string, passed forwards, and escaped by the side of the patella. The peroneal division of the popliteal nerve was evidently injured. Immediately after the injury, loss of power over the foot, and contraction of the flexor muscles of the leg occurred. The permanent results were wasting of the leg, weakness of the muscles supplied by the anterior tibial nerve, excessive hyperœsthesia of the skin on the outer half of the leg,

coldness, lividity, and numbness of the foot; the numbness, however, changing to a sensation of burning pain, when the limb became warm in bed.

Amputations.

Nine amputations after gun-shot injuries were admitted. They were, in respect to situation, as follows:—

Shoulder-joint	1
Humerus	2
Fore-arm	1
Fingers	4
Total	9

They require no remark. There were also four amputations after sabre wounds, viz.:—

Thigh, junction of upper and middle third	1
Fingers	3

The case of amputation of the thigh is worthy of notice. The subject of this operation, a strong, powerful man, Private H. Addison, 43rd Regiment, aged 38 years, had served upwards of 18 years in the East Indies. When engaged in action with the enemy, on the 2nd of January, 1859, near Cottee, he received several sabre wounds, and, among others, one which severed the ham-strings of the left leg, and penetrated the knee joint. In consequence of this injury, amputation of the thigh was performed at the middle third, by the circular method. The ligatures came away at the usual time, but great muscular retraction took place; the bone protruded, there was profuse discharge from the stump, and the man's health began to fail; it was therefore deemed necessary, on the 1st March, 1859, to open the parts, and to remove about two inches of bone. After this, the stump went on favourably, and a month afterwards was perfectly healed. Thus it was that the stump presented the condition of an amputation at the junction of the upper and middle third, a position for the operation which was not understood, as the sabre cut was at the knee joint, until the explanation was obtained from the medical history, which did not reach Fort Pitt until some time after the arrival of the patient. Besides the wound in the leg just described, Private Addison received at the same time five other sabre cuts. These were all on the left forearm and hand. One of them caused a compound fracture of the ulna, the bone being completely divided by the sabre. This severe injury healed very favourably; the only disability which remained was diminished power of flexion of the fingers, from their flexor muscles having been partially divided.

Sabre Wounds.

Eight men were invalided for the direct consequences of sabre wounds. They require no remark, with the exception of one, in which the musculo spiral nerve was divided by the sabre, leading to paralysis of the parts supplied by this nerve.

The sabre wounds were in the following situations:—

Head	1
Upper extremity	7

Five of the latter were on the left arm, received when this extremity was held up, to protect the head and body.

General Remarks respecting the Cases of the Year 1861.

During the year 1861, the number of patients who passed through th Surgical Division of Fort Pitt, labouring under the consequences of gun-shot injuries, was 60. Of these were:—

Polemical	58
Accidental	1
Self mutilation	1
Total	60

None of these 60 were admitted more than once in the course of the year.

Fifteen of the polemical cases were re-admissions from among men who had been under treatment in Fort Pitt at previous periods, and discharged to modified duty, and one case was a re-admission, but of a peculiar kind; leaving, therefore, 42 primary admissions out of the total number (58) polemical invalids admitted. In the instance of the re-admission last referred to, the patient, who had been wounded at both the battles of Alma and Inkerman, was discharged as a pensioner in 1855; but re-enlisted in 1860, with a view of completing twenty-one years' service, and gaining an increase to his pension. His case will be alluded to under "Wounds of the Lower Extremity."

The following Table shows the localities of the military operations in which the 42 freshly-admitted invalids received their wounds. The 16 re-admissions just referred to are not included in this Table; they have been already accounted for in previous returns, viz., 2 in the Crimean returns, and 14 in returns of the Indian Mutiny.

India, 1857, 1858, and 1859	15
Beyt, 1859	1
Burmah, 1856	1
Crimea, 1854 and 1855	6
China, 1860	9
New Zealand, 1860 and 1861	10
Total	42

Of the six campaigns referred to in this Table, two appear for the first time, viz., China and New Zealand. The late war in China has only led to 9 men, from the regiments of Cavalry and Infantry engaged, being invalided for polemical wounds: a remarkably small amount, considering that, among the European troops of the expeditionary army, during the time the force was employed in the field, from the 1st of August to the 15th of November, 1860, there were 122 admissions into hospital, for wounds received in action. This number is independent of 34 others, who either died in hospital from the effects of their injuries, or were killed in action with the enemy. (*See* Army Medical Reports, 1860, Statistical Branch, p. 106.)* The inference is, that the wounds inflicted by the Chinese were generally of a slight nature. It does not seem probable that the number of invalids for wounds received in this campaign will be increased by any fresh accession, as all the invalids despatched from China after the conclusion of the war have long since arrived in England.†

* The discrepancy between the number of wounds in the Expeditionary Force shown in the Statistical Returns above referred to, and the number shown in the "Medical History of the War in the North of China," by Inspector-General Dr. Muir (*see* Reports 1860, p. 383, and elsewhere), evidently arises from the fact of many of the wounds included in the latter being of too slight a nature to require treatment in hospital.

† Non-commissioned officers and men of the Royal Artillery invalided for wounds received in action do not pass through the General Hospital at Fort Pitt, and are not, consequently, included in this report. It appears, however, from returns in this office, that four artillerymen have been invalided, and finally dicharged, in consequence of wounds received in action in China, viz.:—

Driver Francis Wells had the metacarpal bone of thumb fractured by a matchlock ball at the capture of the Peiho Fort, on the 21st of August, 1860. One piece of bone came away, and the wound healed in about six weeks, but the use of the hand was so impaired by the injury as to unfit him for military duty. He was consequently discharged the service with a pension.

Gunner Edward Casey had his left arm amputated in consequence of a severe injury inflicted by a round shot at Peiho Fort, on the same occasion. He made a good recovery, and was also discharged with a pension.

Gunner John George Hare had his right thigh shattered by a round shot in the attack on Tauku, on the 14th of August, 1860. Amputation was performed on the field, and the man made a good recovery, and was eventually discharged the service. The site of the operation is not specified; but as the thigh is stated to have been shattered, it was probably high.

Gunner Solomon Morton was wounded by a matchlock ball on inner aspect of right thigh, close to knee-joint, on the 12th August, 1860, at Sinho. He believes the ball still remains in the limb. There is a small cicatrix on the outer aspect of the right thigh, close to the knee-joint, where an irregularity in the surface of the bone, per-

The war in New Zealand has furnished 10 invalids for polemical wounds. In the Statistical Report for 1860, New Zealand, page 99, it is shown that 82 soldiers were admitted into hospital for wounds received in action with the natives; and that 40 died, 36 being killed in the field, and 4 while under treatment for the consequences of their wounds. The proportion of deaths to wounds is unusually great, and is the more remarkable from the nature of the enemy with whom the troops were brought into collision. It is not improbable that more invalids, from among the troops wounded in the recent hostilities, may hereafter arrive from this distant colony. Of the 10 admitted into Fort Pitt, 9 were discharged from the service, and 1 still remains under treatment, but is likely to be able to rejoin his corps for duty.

The following shows the disposal of the total 58 admissions of invalids for polemical gun-shot wounds :—

Discharged with Pension	52
„ to Duty	5
Remaining at Fort Pitt	1
Total	58

I will briefly refer to the cases included in these returns, under their respective classes.

Class 1.—Wounds of the Head.

Five cases of this class were invalided, three being cases of injury to bone without depression, and two supposed to be accompanied with depression.

Of the invalids for wounds of the head *without depression*, the cause of unfitness in one was persistent headache and vertigo, particularly on stooping, or on unusual exertion. The patient was wounded by a grape-shot at Delhi in 1857. There was a slight adherent cicatrix at the seat of injury, near the right parietal bone.

The second case presented some features of interest. It was as follows :—Private James Newman, 40th Regiment, was wounded in the attack on the pah at Waitara, on June 27, 1860, by a round musket ball, which paseed through his forage cap, and struck him obliquely on the forehead, about two inches above the right supra-orbital ridge, above the frontal sinus, and a little to the right of the mesial line. A jagged oblong wound of the integuments, about two inches in length, resulted; and the outer table of the os frontis was observed to be fissured, but there was no depression. The man appears to have been comatose for a short time after the injury. On recovery, finding himself alone, he managed to creep through the high fern to camp. None of the usual signs of cerebral lesion were observable after his arrival at the field hospital; his only complaint was loss of sensation on touching the scalp for some distance above and in the neighbourhood of the wound. There was no headache, excepting when he coughed, or otherwise jerked himself Several fragments of the bone subsequently exfoliated, and a puckered, depressed cicatrix, into which the end of the thumb could be inserted, took place. When invalided home from New Zealand, the symptoms noticed by the invaliding surgeon were, "dimness of vision of the right eye, accompanied with pain in the head." Considering the close neighbourhood of the wound to the organ of vision, it seemed not unlikely that a fissure, or other injury of the retina, might have been caused by the stroke of the projectile, but ophthalmoscopic examination at Fort Pitt showed that no lesion of this structure had resulted. The imperfect vision was attributable to hypermetropia, doubtless of congenital origin; and, on fully questioning the patient, he admitted that vision in this eye had always been weak and imperfect. Headache, vertigo, and other cerebral symptoms rendered him unfit for service.

The third case was as follows :—Private William Perkins, serving with the 2nd Battalion, Rifle Brigade, was wounded on the capture of the rifle

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ceptible to the touch, exists. Discharged the service in consequence of the existence of persistent "stunning pain" in the leg from the knee downwards, and of lameness consequent on apparent shortening of the limb.

pits before Sebastopol, in April 1855, by a musket ball over the right parietal bone, near the junction of the coronal with the sagittal suture. He was rendered insensible by the injury. He remained under treatment in his regimental hospital until June the 12th, and during this period several small pieces of bone were removed. From June until the latter end of July he was at Scutari, where the wound became closed. After joining his depôt in England, he was employed only in light duties, or as an officer's servant. The principal symptoms which caused him to be invalided were,—local tenderness about the cicatrix, inability to wear a shako without oppression to his head, occasional headaches, and vertigo increased on stooping or subjection to excitement. On admission to Fort Pitt, on August the 8th, 1861, in addition to these symptoms, he stated that he had constantly a fixed pain below the surface of the wound, as if something were pressing him there, and that the degree of this pain varied with changes in weather. The cicatrix of the wound, which was about two inches in length, was considerably depressed, doubtless from exfoliation of the outer table. Such a case as this, after the lapse of time which had occurred before the soldier was invalided, might easily lead to the diagnosis of its having been one of fracture with depression, if judgment were only formed from feeling the condition of the bone and its cicatricial investment, for it exactly simulated such an injury, on examination by the finger.

The two cases stated to have been accompanied *with depression*, are worthy of brief notice. Private William Thompson, 35th Regiment, aged 40, was wounded in the head at the sortie on the advanced works in the right attack before Sebastopol, by a piece of masonry moved by round shot. He was at the time in the Russian graveyard in the Karabelnia ravine. A depression of the right parietal bone is stated to have been caused by this injury ; but, strange to say, no urgent symptoms followed, and, wishing to avoid going into hospital, he remained at duty. It seems not improbable in this case that the depression must have been confined to the outer table. The patient was afterwards again wounded at the assault of the Redan in September 1855. He had his right arm forcibly twisted inwards, and elbow-joint severely contused, by the fragment of a ladder which was broken by grape-shot. The external lateral ligament of the elbow was apparently ruptured. The following is a description of the appearance of the elbow-joint, recorded on the man's admission into Fort Pitt :—"The fore arm, when extended, is in the position of adduction, and at first sight gives an impression that the external condyle had been fractured, and was dislocated outwards. There has never been fracture of any part of the joint. During flexion, the adduction gradually yields. The olecraunon and internal condyle appear rather nearer in a line with each other than they appear in the arm on the opposite side." Although the use of the arm was partially impaired by this injury, this soldier was so anxious to remain at his duty, that he was discharged to join his depôt. It seems not unworthy of mention, as an instance of repeated escapes from hazardous service in the field, that this soldier served subsequently with the 35th Regiment during the mutiny in India, and was one of the very few survivors of the disastrous attack in the Jugdespore jungle, in the expedition under Captain Le Grand, of that regiment, in 1857. He was afterwards invalided from India on account of ophthalmia contracted in the country.

The second case also presents several points worthy of notice. Private Thomas Lappington, 46th Regiment, aged 36 years, under three years' service, was wounded on the vertex of the head, before Sebastopol, in 1856, by a fragment of a shell, which exploded in the air, over a boat in which he was employed at the time coaling Her Majesty's steamer "Sampson." He was then a sailor in the merchant service. The wound was about three inches in length, a little to the left of the sagittal suture, near its junction with the coronal suture. According to statement, he was insensible for several days after the injury. The parietal bone was fractured, and some fragments were removed by the captain of the merchant vessel to which he belonged. He was not attended by any surgeon. He resumed his duty in less than a month, but a discharge was still escaping from the wound, and continued to do so up to the time of his return to Dartmouth, five months afterwards. In January, 1859, he enlisted in the 46th Regiment, the wound on the head being healed, and unnoticed at the time of enlistment. In October, 1859, he left England

for India, and during the passage exposed himself considerably to the sun, while helping to work the ship. Pain in the head recurred, with tenderness and tumefaction at the site of the wound; symptoms of abscess followed; and eventually the old cicatrix became re-opened, and a large portion of necrosed bone was exposed and removed. He was invalided from India, where he was greatly affected by the sun, on account of frequent attacks of cephalalgia, and fits of an epileptoid character. Very moderate quantities of alcoholic liquors excited him violently. The wound was again healed on his arrival at Chatham, but the cicatrix was so tender that he could not bear any pressure on the part. The cerebral symptoms continued, but in a modified degree. There was no return of the fits while he was at Fort Pitt. While in India he had lost all the hair from his head.

Class 2.—Wounds of the Face.

Three wounds of the face occurred. In one instance the wound was on the left side of the face, and caused by a pistol ball at Lucknow. The alveolar process of the jaw was fractured, and the ball lodged beneath the zygoma, whence it was extracted three months afterwards. Necrosis of a portion of the alveolar process, with loss of two molar teeth, and a bicuspid followed. There was also partial loss of hearing on the same side. This patient was discharged, having completed twenty-one years' service. The next case was similar; the left upper maxillary bone was fractured by a fragment of shell. Union took place without loss of bone, but all the teeth on that side became carious. Hearing and vision on the same side were both impaired. On opthalmoscopic examination of the affected eye, small deposits of pigment were observed overlying the retina, probably the consequences of ecchymosis, and there was general haziness of this structure. The dioptric apparatus of the eye was normal.

The third case was remarkable—perhaps unique, as I cannot find that any similar one has been recorded. The injury was followed by total dumbness, without any direct lesion of the tongue, larynx, or those structures which are chiefly concerned in vocalization. The patient, Private James Davis, 1st Dragoon Guards, a stout, healthy soldier, was struck just below the centre of the lower lip, during a charge of his regiment, on the 21st of September, 1860, at the general action of Pal-i-chou, near Pekin, by a small matchlock ball, weighing 7 drachms. The ball penetrated, carried away part of the alveolar process, 4 teeth, viz., 2 incisors, 1 canine, and 1 bicuspid, on the left side, travelled downwards behind the symphysis, clearing away the origins of the genio-hyo-glossi muscles in its passage, and lodged in the soft tissues of the floor of the mouth, below the frænum-linguæ. According to the history of the case, loss of the power of articulation immediately followed the wound, and never returned in the slightest degree, either in China, or during the voyage home to England. The ball was not removed till the twenty-third day after the injury; it was then extracted from within the mouth.*

When this patient was examined in Fort Pitt, the inferior maxillary bone was found to be a little thickened at the seat of injury, viz., at the symphysis, and for about an inch and a half of the left side of the body of the bone. The power of opening the mouth was slightly more limited than natural. The gum was sunk at the place from which the alveolar process had been removed by the projectile. The tongue appeared to be somewhat wasted, and its movements, upwards towards the palate, and forwards towards the lips, rather more limited than natural. There was no evidence of muscular paralysis. The sense of taste was unimpaired, nor was there any loss of ordinary sensation. The larynx seemed unaffected. The usual laryngeal sounds could be uttered, but none of their modifications necessary for speech could be effected. The power of whistling was gone. It did not seem clear to what special cause this total deprivation of the power of articulation was due. Neither injury to the hypo-glossal nerve, if such had occurred, nor the separation of the genio-hyo-

* The man had the ball in his possession at the time he was in Fort Pitt. He would not part with it, and a cast was, therefore, taken of it and placed in the museum. It shows accurately enough the alterations of form and furroughs of surface caused by collision with the bone (Specimen No. 3698.

glossi muscles, seemed sufficient to explain such a total loss of speech, for no similar result has been noted after any of the numerous gun-shot wounds of the jaw, or surgical operations performed upon it, as far as surgeons have recorded the cases. After the closest investigation at Fort Pitt, there did not appear to be any grounds for supposing that the soldier was feigning his disability. Several surgeons, and, among others, an eminent surgeon, in civil practice in London, expressed doubt as to its genuineness, and I felt, although satisfied myself that the symptoms were genuine, that other surgeons hearing of the case would equally have doubts on the subject. I therefore wrote, some time after the patient left Fort Pitt, to a surgeon in the neighbourhood of the place where the man had settled as a pensioner, for information regarding him. If the man had been malingering, it was to be concluded that by that time he would be no longer speechless, there being nothing further to be gained by the imposition. The following was the reply I received :—

"*Wiveliscombe, 5th June*, 1861.

Dear Sir,—I was not able to go over to Crowcombe until yesterday (that village being nearly ten miles distant), and then, unfortunately, did not see Private James Davis, as he had gone up on the quanstocks, and after waiting an hour, I was obliged to return. I took the opportunity of making inquiries among the villagers, at the rectory, at the public-house, and the blacksmith's, and I thus gathered that the man is unable to speak, and the history he gives (in writing) tallies with the account you wrote to me, of his inability to articulate. It appears he either writes what he would say, or makes signs. He lodges with a pensioner named Farthing, who is almost totally blind, and this morning, both the men having heard that I was making inquiries, came over to my house, and I had an opportunity of examining the man. I have seen something of malingering, and I do not think there is anything of the kind in this case, &c.*

"I am, Sir, &c.
(Signed) "Wm. Legge."

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* "*Fort Pitt, December* 1862.

"I have since received further details, which tend to give additional interest to the case of this soldier. At the latter end of July, 1860, he suddenly recovered his voice while in a state of excitement. The following is the account given to me of the occurrence by Major Bace, Staff Officer of Pensioners in the district where the man resided :—'He was in a public-house at Crowcombe, with several others, and had been drinking some ale. The landlady wanted to charge him for a pint of ale which he had not had. I have ascertained that he really had not the extra pint he was charged with, and which was afterwards settled. This caused him to become very violent, and when endeavouring to say "The girl is a liar," he found he repeated the words in his natural voice, but not so fully as he could do three or four days afterwards.' The Rev. Mr. Hotham, Rector of Crowcombe, has given me the same account of the occurrence. He writes :—'Several people were present when the recovery occurred, and it was not a little startling to the company, as there had never before been an attempt at articulation. A bystander reported that the colour rushed to his face so as to make him look almost black; the veins in his neck were distended, and there was everything in his look and manner betokening a sudden explosion.' Mr. Hotham adds, in his note to me : 'I feel more and more convinced, from particulars which have come out in the course of this inquiry, that there is not the slightest ground for suspicion that he feigned deprivation of speech in order to escape service in the army, or for any other cause.'"

Major Bace was kind enough to examine the man on the 1st of the present month (December 1862) at my request, and to transmit to me remarks on his state at that time. The Major reports that his articulation is good, free from hesitation or any other defect; that he has no difficulty in pronouncing each letter of the alphabet distinctly; that he can now whistle, but not as well as he could do before his wound; that he can masticate food thoroughly, but that he does so chiefly on the right side of the mouth, the opposite to that principally injured.

This case is of much interest to the military surgeon, from the liability of dumbness, with so little apparent cause, as shown by the sentiments of several surgeons expressed regarding it, being ascribed to malingering; and also with reference to the length of time which elapsed before speech was restored after such an injury.

Professor Aitken, regarding the case from a pathological point of view, considered the injury to the muscular tissue alone sufficient to account for the dumbness: but that, in addition, the inflammatory changes amongst the tissues in the immediate

Class 3.

No wounds of this class occurred during the year.

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vicinity of the ball (which lay embedded amongst the injured parts for twenty-three days) might be expected to disturb the operation of the ninth pair of nerves, without altogether destroying their influence. He made some notes in writing on the case, and I transcribe a portion of them. He says :—

"The detachment of the insertion of the genio-hyo-glossus muscle is a most important feature in the case. By its destruction, the os hyoides could no longer be drawn upwards and forwards with the base of the tongue. The connexions, also, of the tongue with the pharynx and palate would be slackened; a loss of tension power would immediately result, and thus the stream of air from the pharynx into the mouth would be influenced, and the strength of its impulse would be impaired for the formation of explosive consonants. Even the adjustment of the vocal chords might also be impaired for a time by the slackening of the mucous membrane, in consequence of the falling backwards of the tongue.

"The motion upwards and forwards of the tongue being thus limited in the first instance, retraction of the damaged muscular fibres would continue to increase for some time after the injury, and considerable loss of muscular substance would take place as one of its consequences. Subsequently, new attachments of the injured fibres would form, with a diminished range of action.

"The repair of muscle and tendon is a very slow process, and it is slower in proportion as the violence of the injury is greater. It rarely takes less than twelve months to unite thoroughly muscle and tendon and nerves, especially when injured by such violence as a gunshot implies. In this case the muscular fibres were repaired, and function restored in about eleven months after the injury."

Such are Dr. Aitken's observations. But supposing the aphonia to have been wholly due to the physical injury described by Dr. Aitken, would not the restoration of speech have been marked by gradual improvement, in proportion as the injured tissues became repaired and gained strength? May there not have been, in addition to and independent of the structural lesions, an amount of nervous shock sufficient partly to explain the aphonia which followed the accident? We know that temporary aphonia does occur from hysteria, fright, great nervousness, and other such causes. In these cases, the disorder is a functional paralysis, in which the nerves transmit only imperfectly, or refuse to convey altogether, the dictates of the will to the muscles concerned in articulation, but suddenly become obedient, and fulfil their function under the effects of unusual excitement and intensity of volition. To exercise the faculty of speech, not only the organ of sound, the larynx, as well as all the organs essential for articulation—the pharynx, hard and soft palates, tongue, lips, and nostrils—must be in a healthy condition; but also the nervous centres, and the capability of the nerves themselves to convey their mandates so as to excite a co-ordinate action of all the organs referred to, must be healthy and complete also. The sudden recovery of the power of speech in the instance of this pensioner strongly resembles the equally sudden recoveries which have taken place in cases where the aphonia has been caused by extreme nervousness, sudden fear, and hysteria, but was no doubt due, to a certain extent, also to the causes described by Dr. Aitken. An interesting case, but not admitted at Fort Pitt, of complete aphonia following sunstroke in India, occurred during the year 1861; also with sudden recovery of voice after his arrival in England. The following are brief notes of the case :—

Gunner Charles Windram was invalided from Bengal by Staff-Surgeon Hardie, on account of loss of power of speech after sunstroke. There was no loss of sensation, common or special, of the tongue, nor was its power of motion at all impaired. He replied to questions by writing on a slate. He arrived at Woolwich, speechless, in June 1861, and was admitted under "Paralysis." Shortly afterwards, he suddenly regained the power of articulation, while being inspected by a medical officer, and, after observation for two or three days, returned to duty.

Those physiologists who refer the control of the co-ordinate actions required for the due performance of the function of speech to the corpora dentata of the olivary bodies, would doubtless trace the loss of power in this instance to some lesion in their substance, so connected does his medulla oblongata appear to be with some of the symptoms of sunstroke; but no such lesion could be supposed to have followed the stroke of the bullet to account for the dumbness in the case of Private Davis.

Class 4.—Wounds of the Chest.

Seven wounds of the chest were admitted; of these, three were re-admissions.

The first was an injury to the soft parietes only. It was a flesh wound of extensive character, caused by a traversing grape-shot, which entered 3½ inches below the right mamilla, passed beneath the skin, and made its exit one inch and a-half externally, and on the same level. The healing process occupied four months; the wound of entrance closing first. The cicatrices were very large in size, puckered, but non-adherent. The man was discharged to duty.

The second case was also a non-penetrating wound, but with injury to bone. Private Thomas Dyer, 44th Regiment, was wounded at the capture of the Taku Forts, by slugs, in twelve places, on the right side of the chest and lumbar regions. The twelfth rib was injured by one of these missiles, and several pieces of bone subsequently exfoliated; all the other wounds healed quickly. He stated that he passed blood several times by stool after the injury. Some of the wounds appear to have been sinuous in character, and the cicatrices were alleged to cause inability to bend the side without sensation of contraction and pain. He was admitted into Fort Pitt on September 1, 1861, and on the same day a small bullet was excised from the left lumbar region, the opposite side from that where the ball entered. The bullet was lying embedded in a distinct capsule.

The third case, one of Private Robert M'Millan, 78th Regiment, was sent home as an instance of a perforating wound of the chest, but was clearly proved to be one in which the ball, after striking the edge of the sternum at an acute angle, had made a circuit external to the parietes of the chest, passing through the axilla. Injury to the brachial plexus, and a variety of other signs, led to the unavoidable conclusion that the ball had traversed outside the chest.

In a second wound of this kind the ball had traversed the front of the chest from side to side, injuring a rib in its exit. Hæmoptysis followed the injury, and subsequently exfoliation of the bone occurred. Dyspnœa on exertion, and inability to bear the pressure of his accoutrements were the causes of invaliding.

The next case is one of peculiar interest, having been accompanied with that rare complication of a gun-shot wound—general subcutaneous emphysema. The history is as follows: it was chiefly derived from the patient himself. Private Jeremiah Murphy, 40th Regiment, admitted 31st May, 1861, aged 27, a fine muscular man, was struck in the left shoulder on the 27th of June, 1860, at Waitara, in New Zealand, by a musket-ball. The projectile was probably a round one, weighing nearly an ounce—that being the usual weight and shape of the balls used by the New Zealand natives. It was fired from an elevated position. The ball entered 2¼ inches beneath the left acromial process, on the external aspect of the shoulder. The cicatrix of the wound is circular, showing the straight direction of entry of the projectile. There was no wound of exit. The ball lodged, and its site has not been discovered. Immediately after he was wounded his arm dropped powerless by his side, his mouth became filled with blood, he became faint, and fell. The spitting of blood continued; so that he expectorated altogether, he thinks, about a pint, chiefly in clots. He never wholly lost consciousness. He was conveyed in a bullock-cart about a mile, over rather a rough road. Emphysema of the left shoulder and of the parietes of the chest on the left side, both anteriorly and posteriorly, extending down to the lumbar region, was present next day. This was mentioned by the surgeon in the few remarks which were sent home with the invalid; no information respecting its subsequent progress or subsidence was given.* There was also pain within the chest, a "catch" in breathing, as if

* Mr. Murray, who went from Australia to New Zealand on the rebellion of the Maori natives, and was attached as an Acting Assistant-Surgeon to the 40th Regiment, and under whose care this case fell, has passed through the Army Medical School with great credit during the present year (1862). He informed me that in the engagement with the Maoris, in which Private Murphy was hit, there were 65 men of the 40th Regiment killed and wounded; and that from the circumstances in which they were placed, and the amount of duty which fell on the two medical officers with the regiment, it was not possible to keep full reports of the cases. But Mr. Murray kept a pocket memorandum-book for noting down special occurrences

from pleurisy, felt—particularly at the *bottom* of the left pleural cavity. According to statement, the dyspnœa was very severe for about a week, and the patient was told he had been constantly wandering during that period. Expectoration of blood and the pleuritic symptoms continued for about a fortnight. The wound healed in about six weeks. Local application of lint to the wound of the shoulder was the only treatment: no venesection was practised. After all active symptoms had subsided, tonics were administered.

The following was the state of the chest noted on his admission at Fort Pitt: "There is an appearance of fulness of the left supra and infra clavicular regions, but the girth of each side of the chest on measurement is nearly equal. No flattening observable. Very slight differential dulness is noted on percussing the left side, near the apex of lung; but the vesicular respiratory sound is normal throughout. The chest expands well on both sides. The man states that he cannot bear the pressure of belts across the chest, and that any fettering in its movements, when he is under exertion, causes much feeling of oppression. He states also, that he has some stiffness about the shoulder and tenderness on pressure in the neighbourhood of the cicatrix. A small conical exostosis can be felt almost immediately below the cicatrix, projecting from one side of the bicipital groove. The bone was probably struck by the ball in this situation."

There are many points of importance in this case. A recovery, after an undoubted wound of the lung, so perfect that the respiratory murmur should be left normal throughout the organ, without any depletion by venesection having been had recourse to, is a fact that would have been regarded as little short of an impossibility in the time of the Peninsular campaigns. It serves, however, to strengthen the experience afforded by several similar cases which occurred during the Crimean war. It seems not unworthy of consideration how far the partial collapse of the lung, which must have been caused by the pneumo-thorax in this instance, may have prevented general adhesion between the pulmonic and costal pleuræ, and modified other accidental consequences which are not unfrequently found to attend chest-wounds involving the organs of respiration.

This case also affords an example of lodgment of a bullet in the chest—probably in the lower part of the pleural cavity. The fact that the pleuritic pain was referred chiefly to this situation, notwithstanding its remoteness from the site of injury—and this, too, almost immedialy after the wound was received,—points to this conclusion. The bullet is now probably fixed by lympth thrown out at the time the pleural membrane was in a state of inflammation; so that its presence is not rendered perceptible by changes of posture. A sergeant of the 41st Regiment was wounded in the trenches before Sebastopol by a rifle-ball, which passed through the apex of the left lung, and fell to the bottom of the pleural cavity. He survived the wound ten days. At the post mortem examination the bullet was found embedded in lymph on the upper surface of the crus of the diaphragm. Mr. Guthrie and others have recorded similar cases.

The next two cases are illustrations of *perforating* wounds. The first occurred to Private William Moore, aged 41 years, 2nd Battalion Rifle Brigade, of 20 years' service, and the following are the notes taken on his admission at Fort Pitt on July 12th, 1861: "When engaged in loading his rifle on the 28th of November, 1857, at Cawnpore, he was wounded in the lower part of the left side of chest by a musket-ball. The projectile was fired from a distance of about seven or eight yards by a Sepoy, who was standing on the same level as himself, but a little to his left. The ball entered about three inches below the left nipple, and two and a quarter to the left of the mamillary line, fractured the eighth and ninth ribs, and made exit on the same level, six inches external to the spine, fracturing the tenth rib in passing out. His stomach was

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(a provision which no surgeon in the field should be without), and he was kind enough to let me peruse the notes which he then made. These confirmed the account of the case given above, especially the pleuritic pain at the lower part of the chest ("about the eleventh or twelfth rib"), and the extent of the emphysema. Mr. Murray said that there was a remarkable absence of symptoms in the further progress of this case, and that had it not been for the expectoration of blood and emphysema, no one would have believed the lung had been wounded.

empty at the time. He immediately fell forward. He states that immediately he received the wound he fell down upon his face, and that almost in an instant blood came profusely from his mouth. He did not become unconscious, but says he remembers every circumstance connected with the injury. He lost more blood by the mouth than by the wound. A piece of his tunic was taken out of the opening in front on the morning after he received his wound. He spat up small quantities of clotted blood, at intervals, all the time he was in the field-hospital, which was nearly two months. Considerable hæmorrhage also took place at first from the wound of entrance, the blood being frothy; and for some time, with the act of coughing, air was forcibly expelled through this opening, so as even occasionally to blow off the piece of wetted lint which was used for a dressing. He lay on his right side during the whole course of treatment, which consisted only of cold applications. No bleeding by leeches or other means was practised. After two months he was sent to Allahabad, where he remained one month, and thence proceeded to Calcutta. After another month's interval in hospital at this last station, he embarked for England. During these periods, and in the course of the voyage home, eighteen pieces of bone were removed from the entrance wound and five from the wound of exit.

On his arrival at Fort Pitt, in July, 1858, the anterior wound was healed; but the posterior wound was still open, and giving issue to a purulent discharge connected with necrosed bone. Subsequently a large sequestrum was removed by forceps from this situation. In September, 1858, he went on furlough for two months, and during this period the wound of exit became healed. In February, 1859, he was sent on recruiting service, and he continued in good health until December of the same year, when the wound of exit again became open, and another small sequestrum was detached.

On examining the site of the wound in 1861, both the ninth and tenth ribs were found to be united by a fibrous elastic material, which yielded on the slightest pressure. There was much tenderness about the cicatrix. The left side of the chest expanded equally with the right, and other symptoms of pleuritic adhesions existing to any great extent were wanting. There was no marked dulness on percussing the neighbourhood of the wound, but the respiratory murmur was feeble and distant.

The second case occurred to Private Patrick Farrell, invalided from the 45th Regiment, and the following is an abstract of its history: He was wounded at Lucknow, on the 8th of September, 1857 (being then in the 90th Regiment), by a musket-ball fired from an elevated position at a distance of about seventy yards. The ball entered the chest between the ninth and tenth ribs (fracturing the ninth and grooving the tenth) in the central axillary line, and emerged about half-an-inch external to the spinous process of the first lumbar vertebra. The scar of exit remains so deeply depressed and adherent, that the ball must have passed out from within, and the idea of an external circuit cannot be entertained; but whether the lung or liver were ever wounded admits of question. This invalid was first admitted at Fort Pitt on the 10th of October, 1858. Unfortunately the remarks in the medical history sent with him on that occasion from India give no assistance in forming a correct diagnosis as to any visceral injury. He was discharged to duty from Fort Pitt on October the 15th, 1858, and not again admitted until October 1861. It was stated by the invalid himself, that hæmoptysis followed the injury; and that some pieces of bone from the fractured rib were eliminated through the entrance-wound in the progress of cure. Both wounds became healed in about three months. On his last admission at Fort Pitt, on the 12th of October, 1861, he was suffering from softening tubercle in the apex of the left lung, and indications of tuberculous deposit in the right lung; and these were the immediate causes of his being invalided from further service.

Classes 5, 6, and 7.

No wound of these classes occurred.

Class 8.—Wounds of Upper Extremities.

Eighteen wounds of the upper extremities were admitted, of which five were re-admissions. Eight of these were simple flesh wounds, two with

fracture of the clavicle, one with fracture of the scapula, one with compound fracture of the humerus, one with injury to the structures of the carpus and metacarpus, and five with injury to fingers.

None of the simple flesh-wounds presented features of special interest. Contractions, and partial stiffness of joints from long position during treatment, were the chief causes of invaliding.

Of the two cases of fracture of clavicle, one was united, the other remained ununited by bone. In the united fracture, there was loss of substance to an inch in length. In the ununited case, ligamentous connection existed; fibrous bands joining the two ends of a fragment of bone, which had been tilted up in an upright position, to the corresponding remaining portions of the clavicle which had remained in situ. This fragment was one inch and a-half long. There was complete paralysis of the arm, but a slight power of flexion remained in the wrist and fingers, which were, however, permanently contracted to a considerable extent. The injury occurred by an accidental discharge of a rifle in the Taku forts after its capture.

The fracture of the humerus remained ununited. The patient, Private R. Fitzgerald, 44th Regiment, was wounded at the attack on the Taku forts, by a slug, and was placed on board ship two days afterwards. The man stated that he had been in good health previous to the injury, and had never had venereal disease, or taken mercury. The flesh wound healed about two months after the receipt of the injury. When admitted into Fort Pitt the arm was much wasted, and the humerus was remarkably slight in size.

The wounds involving the hand and fingers do not call for special remark. In two instances which occurred in New Zealand, the injuries were caused by accidental discharge of rifles before the enemy, from the triggers becoming entangled in the bush through which the men were moving.

Class 9.—Wounds of Lower Extremities.

Twenty admissions occurred in this class; of these, six were re-admissions from former years.

Ten of the twenty cases were simple flesh wounds and contusions. One of these is worthy of notice, having been sent home as a case of penetration of the knee-joint. The diagnosis had been chiefly derived from the escape of what appeared to be synovial fluid from the joint; but from the history, and close examination, it appears more probable that this fluid had escaped from the bursa below the ligamentum patellæ. The case was the following:—Private James Hogan, 40th Regiment, aged 27 years, of 9 years' service, was wounded in the engagement with the Maories in New Zealand, on June the 27th, 1860. He was kneeling on his right knee, the left being flexed rectangularly, when a ball struck the latter about half an inch below the lower margin of the patella, in the position in which it was then placed. Blood and a synovial-like fluid escaped from the wound. The man was, however, able to walk after the injury half a mile through high ferns. There was no wound of exit, the ball having bounded back from the tense ligament with which it came in contact. The day after there was considerable effusion into the joint, and periarticular swelling and redness. On June the 30th the inflammatory symptoms had almost disappeared, and the wound was nearly healed. Had the synovial membrane been opened by the ball, the synovial fluid could hardly have accumulated in the joint as described, but would have continued to flow through the track made by the bullet; the projectile itself could scarcely have escaped from entering and lodging in the articulation at the time the wound was inflicted; and suppuration in the joint would have followed. Moreover, we know that in the flexed position of the knee, the ligament of the patella, being tightly stretched, presses back the considerable cushion of fat, which lies between it and the synovial membrane, towards the interior of the joint, so as to fill up the space which would be otherwise vacant. In this way the synovial membrane is removed farther back, and protected from the risk of being directly injured on the occurrence of a wound in the direction above-mentioned. The surgeon in charge of the ship in which this invalid returned to England, stated that he walked about without the least difficulty during the voyage; but, on arrival

at Fort Pitt, the man complained of stiffness of the joint and lameness. No abnormal condition, nor indication of impaired function, could be detected in the knee, and the man was discharged to duty.

The following case of flesh wound is instructive, in showing certain consequences of the lodgment of a bullet in the glutæal region :—Private Andrew Madden, 35th Regiment, aged 25, was wounded when on field service in the Kareen jungles, Burmah, on the 6th of June, 1856, by a musket bullet. The ball entered three inches below the anterior superior spinous process of the ilium on the left side, passed backwards, and buried itself in the glutæal muscles. No attempt was then made to extract it, as it could not be felt. The wound gradually healed, but he suffered afterwards from pain which was attributed to the effects of rheumatism.

On the 24th of May, 1857, this soldier was admitted into hospital at Rangoon, for what was supposed to be a slight attack of intermittent fever. At the same time the glutæal region became painful, and a hard, circumscribed, deep-seated swelling was felt on pressure. This swelling increased. On August the 26th, 1857, an incision two inches in length was made ; some pus was evacuated, but no bullet could be discovered, though examination was made for it. The patient was left in hospital at Rangoon on the regiment being moved to Bengal.

On April the 28th, 1858, he was admitted at Fort Pitt as an invalid from Burmah. There was then a small opening in the situation of the above-mentioned incision remaining unhealed ; and, on a probe being passed into this, a sinus was found to lead deeply into the buttock. The man complained of pain in the groin, and along the crest of the ilium, and occasional stiffness extending along the back of the thigh down to the ham. He walked with a slight halt, and stated that if he walked quickly, the pain in the inguinal region was increased. It appeared evident that the open track in the glutæal region led to the site in which the bullet was lodged, and on the 10th of May, 1858, a longitudinal incision was made by the side of the sinus by Staff-Surgeon Dr. Williamson, and the ball extracted. The wound was healed in a month, and on June the 15th the man was discharged to duty.

On the 18th of November, 1861, this soldier was again invalided from the depôt of his regiment, as unfit for duty, from the effects of his wound. He complained that the limb became quickly tired on exertion of any kind, and that he experienced difficulty in mounting steps. There was scarcely any perceptible wasting of muscles, and it was thought that he exaggerated his disability. The adhesions, however, which were probably contracted from the effects of the inflammation, suppuration, and sinuses resulting from the passage and prolonged lodgment of the foreign body, would, doubtless, sufficiently account for the inconveniences of which he complained. At this period a very distinct slit in the fascia lata still marked the site of the original entrance of the bullet, and I am led to believe, from repeated observation, that the openings made by bullets in such fascial aponeurotic coverings never do become united.

In the remaining cases of this order, the same general causes of invaliding existed, which have been already noticed in previous reports.

In four cases the bone was injured *without fracture.* Periostitis, and subsequent exfoliation of superficial layers of bone, with adherent cicatrices, were the consequences which unfitted the soldiers for further service in these injuries. Six were complicated *with compound fracture*, two being fractures of the femur, two of the tibia, and two of bones of the great toe.

Both of the cases of fracture of the femur occurred in soldiers invalided from New Zealand. They were both near the lower third, and neither appeared to have been aggravated by comminution or splintering. The following are brief histories of these cases :—

Private John Goddard, 65th Regiment, aged 41, was wounded at Waitara on the 17th of March, 1860, by a musket ball, fired from an elevated position, at a distance of about 300 yards. He was walking forward at the moment he was hit. The projectile entered the external aspect of the right thigh, about four inches above the knee joint, fractured the femur in the lower third, evidently without splintering. There was only one opening in the integument, and the projectile was supposed to have lodged. He remained under treatment

at Taranaki until August, when he was sent to Auckland, and from thence invalided to England.

On his admission at Fort Pitt, on the 25th May, 1861, no indication of the presence of the bullet could be found. He was in good general health, had gained great power in the limb, and was able to walk without any difficulty or uneasiness, with the aid of a stick. The scar of entrance was small, and beneath it was felt a very defined and sharply-margined aperture, through the fascia. The femur was shortened about one inch and a quarter.

The second case was that of Private George Wilmot, 65th Regiment, aged 23 years, who was wounded at Taranaki, New Zealand, on the 6th of November, 1860. According to statement, he was lying on his left side, with his right leg slightly elevated, and was engaged in loading his rifle, when he was struck by a musket ball, which entered the outer aspect of his right thigh, two inches and a half above the knee joint. The ball pursued a course upwards, and slightly forwards, and lodged just below, and external to the trochanter major, from which situation it was excised. In its passage it fractured the femur, in the inferior portion of its middle third. Shortening from one inch and a half, to one and three quarters, had resulted. This invalid was admitted into Fort Pitt on the 3rd of December, 1861. The fracture was firmly united, and the motion of the knee joint was not at all impaired. The cicatrix of the wound of entrance was thickened, and slightly elevated, but no opening was perceptible in the fascia. No sequestrum of bone had ever come away.

There was little doubt in my mind that this was not a case of true compound fracture, or, in other words, that there had never been any communication between the external wound and the wound of the bone. I do not think the fascia even had been penetrated, for I have never yet known an instance where a gun-shot penetration of fascia did not, as before remarked, leave evident indications of the injury. It appeared to me that in this instance the ball must have fractured the femur by the force of its first collision with the limb, and, without penetrating the deeper tissues, have been deflected by the impact subcutaneously upwards to the trochanter. In addition to the absence of any slit in the fascia, the fact of no sequestrum having been detached, and especially the direction taken by the projectile, supported this view of the case.

The two cases in which the tibia and bones of the foot were fractured, do not call for special remark.

Class 10.

No cases of this class were admitted.

Class 11.—Wounds of Joints.

The following case of perforation of the left wrist joint is so far worthy of notice, as showing how extensive an injury of the articulating structures may occur, and the hand be yet preserved. It will also serve to show, that though motion only of a most limited extent may be retained, still that this may be of value to the possessor. In this instance the rifle was discharged almost in immediate contact with the joint injured. All the movements of the hand and wrist were lost, but the use of the metacarpal bones of the thumb and little finger were preserved, so that they could be brought into apposition.

The following were the notes taken on the invalid's admission at Fort Pitt, on May the 3rd, 1861:—

Private William Quinn, 44th Regiment, aged 34 years, when assembling for morning parade, on the 16th of March, 1858, having supported his firelock against a wall, was in the act of holding his hand over the muzzle, according to statement, to save it from falling, when it went off, and a ball passed through his hand. He acknowledged that he had been drinking for several days before the accident, and that in consequence he had been so stupified as not to be able to account for the piece having been loaded; he supposed he must have done it without thinking what he was about. He was tried by court martial, and the court found him guilty of self mutilation. On examination, at the time of the accident, it was found that the ball had passed through the wrist joint. Con-

servative treatment was adopted, and proved successful; but perfect anchylosis of the wrist and carpal joints had resulted. When examined at Fort Pitt, a deep retracted cicatrix marked the entrance wound in the flexor aspect. There was general contraction and wasting of the fingers. The distal phalanx of the thumb was fixed in a flexed position. The metacarpal bone of the thumb was freely movable, and this was the only part of the hand in which mobility was not at all impaired. The little finger was flexed in all its joints, but could be made to meet the thumb, when the latter was opposed to it; and by means of this slight residue of manual function, the man was enabled to grasp instruments, and perform many little acts for himself of considerable utility.

Class 12.—Wounds of Nerves.

Three cases of this class occurred, the brachial plexus being injured in each instance. Two of the patients were invalided from the late war in China, and one was a re-admission from the Indian mutiny.

In the first case, the ball, after injuring the axillary nerves on the left side, passed towards the thoracic parietes, and lodged. The symptoms showed that there had been a severe percussion of the chest and its pulmonic viscera. Paralysis and anæsthesia of the left arm were the causes of discharging the soldier from further service. The following are notes of this case:—Private William Barrett, 44th Regiment, was wounded in the attack on the Taku Forts, on the 21st August, 1860, by a matchlock ball. He was kneeling at the "Present," when he was struck by the missile, which was fired from an elevated position.

The ball entered the left shoulder, three inches below the acromion process, about one inch and a quarter above, and one inch external to the anterior axillary fold. The left arm became immediately powerless. In the few remarks which were sent with this patient from the Hospital Ship, "Lancaster Witch," there was no mention of hæmoptysis having occurred; but the invalid himself stated that two days after the wound some small quantities of clotted blood were expectorated, and that this symptom continued for a week, with severe pain, and dyspnœa. Private Barrett was admitted into Fort Pitt on the 18th of April, 1861. At that date, the left arm, with the exception of the shoulder, was anæsthetic, and its extensor muscles paralysed. The brachial artery pulsated very indistinctly, and seemed to be partially closed. The chest expanded freely and equally on both sides. The percussion note was somewhat higher and shorter on the left side anteriorly, while the pectoral fremitus and vocal resonance were diminished. No indication existed to show the place of lodgment of the ball. This case was sent home as a penetrating wound of the lung, with lodgment of the ball within the chest; but neither the history of the injury, progress of symptoms, nor condition of the invalid on his arrival in England, would indicate his having laboured under so severe a wound, with such a dangerous complication. The chest was probably struck by the bullet, after wounding the nerves, in such a way that a certain amount of contusion of the lung resulted, giving rise to the usual symptoms, and followed by some pleuritic inflammation; but the chief injury was that to the axillary plexus.

In the second case, the ball traversed the axillary region, and was followed by partial paralysis, anæsthesia, and wasting of the forearm and hand. The following account was obtained from the invalid himself; no medical history was received:—

Private Emanuel Carlick, 44th Regiment, aged 28 years, was wounded at the attack on the Taku Forts, on the 21st of August, 1860, by a matchlock ball. It entered the right axilla, about an inch and a half above the inferior margin of the pectoralis major, and made its exit a little anterior to the margin of the latissimus dorsi muscle, in the posterior angle of the arm-pit, injuring the brachial plexus in its course. The arm immediately dropped powerless by the soldier's side; numbness and wasting of the forearm followed; the hand became fixed in a flexed position at the wrist joint; while the phalanges of the fingers, with the exception of those of the second and third fingers, which were slightly flexed, remained extended. A minimum of mobility was preserved; a little more power of motion existed in the thumb and forefinger than in the other fingers. The wasting of the hand was considerable Blebs

occasionally appeared, until October, 1860, but since that date there has not occurred any eruption on the anæsthetic integument.

The third case was an injury to the cervical and brachial plexus, and was associated with probable injury of the œsophagus. Private Robert Orprey, 1st Battalion 20th Regiment, was admitted on the 27th of July, 1861. He had been wounded in the neck, in a street-skirmish, after the capture of Lucknow, on the 18th of March, 1858. He was kneeling at the "Present," and his neck was bare at the time. The musket-ball which struck him was fired from a distance of twenty yards, from a slightly elevated position, nearly directly opposite to him. The projectile entered over the cricoid cartilage, or rather at the crico-thyroid space, a little to the left of the mesial line; passed backwards, and slightly downwards; and made its exit just above the superior inner angle of the scapula on the left side. It must have passed beneath the sterno-mastoid muscle, and then superficially to the place of exit. The left arm is stated to have become paralysed and very anæsthetic immediately after the receipt of the wound. On admission, in July 1861, the elbow-joint was contracted in a state of flexion, and the head was bent over towards the left side from contraction of the neck. He had been sent to try modified duty in April, 1859; but was found to be unable to bear the pressure of his stock on account of the pain caused by it in the neck. The pressure of his shoulder-belt also caused a feeling of weakness and numbness of the arm on the affected side.

Amputations.

Two cases of amputation after gunshot wounds were admitted. One was an amputation of the femur in the middle third, on account of secondary hæmorrhage after a gunshot wound of the leg in China. The second was an amputation of the middle finger of the left hand, after a wound received at the final assault of the Redan. But in this case the invalid was discharged from further service for other disabilities.

Sabre Wounds.

Six sabre wounds were admitted during the year: five being polemical, and one inflicted by a comrade. The five polemical wounds were situated as follows:—1st. The right side of the neck and ear, and also of the right elbow; 2nd. Left fore-arm, the ulna being grooved by the stroke of the weapon; 3rd. Left thumb, the extensor tendon of the proximate phalanx being divided; 4th. The back, the attachments of the lumbo-dorsal muscles to the spinous processes of the 10th and 11th dorsal vertebræ being divided, and a permanent gap resulting from retraction; 5th. Right hand, the extensor tendons of the thumb being injured. The results of the wounds in the remaining case, in which the injuries were inflicted by a comrade, were of an aggravated character. Paralysis of the left facial nerve, and contraction of the right elbow-joint, were the immediate causes of the invalid being disabled for service. The following notes were taken of this case on admission at Fort Pitt:—Corporal Alfred Moxon, 17th Lancers, presents the cicatrix of a sabre wound, inflicted by a comrade on the 3rd of July, 1860, at Secunderabad. It extends from the centre of the left supra-orbital ridge, where a distinct groove is felt in the bone, downwards and outwards across the lower third of the external ear, as far as a little behind the mastoid process of the same side. The cicatrix over the zygoma is deeply depressed and adherent to the temporal muscle, which was no doubt partially divided. All the muscles supplied by the facial nerve, which must have been divided close to its entrance into the face, are perfectly paralysed. There is a second cicatrix over the parietal bone, which was exposed by the wound. A third cut, inflicted at the same time, injured the internal condyle of the right humerus; and has led to contraction of the elbow-joint in a state of rectangular flexion. Pronation and supination of the fore-arm are free. Perfect anæsthesia of the little and ring-fingers, and considerably impaired power of mobility, have resulted from injury to the ulnar nerve.

EXTRACTS FROM ANNUAL REPORT, AND RETURN OF SICK TREATED IN THE LUNATIC ASYLUM, FORT PITT,

From 1st January to 31st December, 1861.

By Staff Surgeon Luke Barron, M.D.

The various classes of mental diseases, as shown in Table No. 1, are believed to represent fairly the several types of those affections which have been under treatment in the course of the year. There must always be a certain amount of doubt, and consequent error, in diagnosing, more or less quickly, cases of unsoundness of mind, depending, as such decision must, on evidence of a very transitory nature; differing in this respect from cases of physical disease, and, on account of the intimate relation existing between some forms of insanity, as well as from the gradual procession of one class of mental disease into another, making the line of demarcation between the two so difficult to define. This is especially evidenced in Dementia following Mania or Melancholia, the features of one being so interwoven with the other as to be often scarcely separable. I may also instance a set of cases not uncommon here, in which the diagnosis between Melancholia and Dementia is somewhat difficult: patients who arrive in a state of utter prostration, completely indifferent to everything surrounding them, inattentive to the calls of nature, refusing their food, and often requiring to be fed forcibly; absolutely silent, or having only spoken a few words during their entire residence here; remaining crouched in secluded places, or, if allowed to remain in bed, continuing for hours together with eyes closed, without moving, curled up, with their knees close to their chins, and frequently giving no indication that they understand or even hear what is said to them. In these cases it is believed that there is a stupor and oppression of the mental faculties, rather than obliteration or decay, and they have been therefore placed under the head of Melancholia. In favour of this view is the fact, amongst others, that some of these patients improve much, or altogether recover, under treatment, which is a termination scarcely to be looked for in extreme Dementia. Their inattention to the calls of nature produces much trouble and inconvenience, and such men are perfectly unaffected by the measures which are found to be quite effectual in the cure of similar habits in men with congenital weakness of intellect. It is probable that the state of mind and conduct just described is often attributable to some all-absorbing and appalling, but suppressed delusion.

As an exemplification of the class of case referred to, I may give here an extract from a letter received from a patient at Bow Asylum, who was under treatment in this hospital during the past year:—"I assure you, with the exception of two or three occasions, I was incapable of speaking, for I tried repeatedly, and felt myself unable to articulate my ideas. The two occasions on which I remember speaking were, the first, in which I charged the Orderly, Mitchell, with trying to deform me, at which time Serjeant Cope was present; the second time was when Serjeant Cope spoke about the invasion of Portugal. I assure you that on both these occasions I resolved with myself to converse with you next morning; but, alas! when morning came, I found my memory gone, and felt as, if I opened my mouth, it would melt away. I always thought my face diminishing, and that every day would be my last. I often thought I was dead, and wondered at daylight coming again. Such thoughts possessed me until a week after my arrival here, when my observation was aroused by the singular conduct of some of the patients, and from that moment I felt my power of speech improve; my ideas became clear, and my memory returned. Since then I have steadily improved."

Having used the terms "delusion," "illusion," and "hallucination," it may be as well to explain shortly the sense in which these words are understood. A delusion is supposed to mean a false or delirious conception of any kind, having its origin in the imagination, without reference to impressions conveyed to the mind by external objects through the senses; as, for instance, where a man believes himself to be a king, a prophet, immensely wealthy, &c. An illusion exists where a person entertains a false perception of an object, such as supposing a hat to be a crown, a chair a horse, &c. Hallucinations are groundless perceptions of things that have no real existence, such as hearing mysterious voices or words, that are often plainly distinguished, seeing reptiles, &c. These false perceptions may affect all the senses, and this disordered condition seems to be present in every type of insanity. These three terms are, however, in common parlance used indiscriminately to express the same meaning.

With regard to the remedies employed, and found to be most successful in curing patients of their dirty habits, such as wetting their beds, &c., it may be useful to point out a few of the most common of these measures. Frequent visits are made to such patients during the night, when they are awakened, and taken to the water-closet by an attendant. This step is usually effectual with men of congenital weakness of intellect; but in some cases it is necessary also to wash them in cold water in a sitz bath, and this course (harmless as it is) rarely fails to check these dirty practices.

With respect to the treatment pursued in this establishment, little need be said, as the general rules which have guided the practice of former years, have, with very little variation, been continued during the past twelve months. It is unnecessary almost to say that if a patient is labouring under physical disease of any kind, this becomes the first object, and every means likely to restore him to health, or to mitigate his ailments, are adopted. For his mental affection, the main remedies depended upon are of a moral character; the avoidance of all irritation, where possible; soothing, amusing recreation, and such occupation and employment as the hospital affords, are some amongst the measures had recourse to. Whenever insane patients can be induced to work with any degree of interest in the labour in which they are employed, they almost invariably show an improvement in their mental condition. These measures, the liberal use of warm baths, douches to the head, and a full scale of diet, may be said to comprise our principal means of treatment.

No mechanical appliances of restraint are ever used in this establishment, and seclusion is often the only means we have of calming maniacal excitement in cases of insanity.

Table No. 1 gives at a glance the principal details in connection with the admission and disposal of the patients treated during the past year.

Table No. 2 shows that the men requiring forcible or artificial feeding have been much fewer, and that the period of resistance against the ordinary mode of feeding has been comparatively short.

Table No. 3 shows the numbers of cases of seclusion. They are higher in this than last year; but the number of unruly patients has been greater than heretofore. One man, in whose case the longest period of separation was endured, invariably exhibited increased excitement on coming into contact with his fellow patients, and was favourably influenced by solitude.

Table No. 4.—Having been struck by the number of cases in this hospital in which an unsymmetrical configuration of the cranium existed, as noticed in last year's Report, I have kept a return of all such cases during the past year, of which this Table is the result. Only the instances of this peculiar malformation are here noticed. All cases of purely low development, small capacity or measurements, and other defective conformations of the skull, are given in the next Table (5). In many cases where an absence of symmetry of the head existed, a corresponding distortion of the face was also present. The proportion to the total admissions is certainly very large, and fairly warrants the deduction that this disparity between the hemisphere of the encephalon exercises a marked influence in the production of mental disease. That such a consequence should follow, seems natural where a normal condition of the functions of the brain is so dependent upon a healthy condition of its various parts, and where but a slight deviation from this state, even in a very small

portion of this organ, often gives rise to marked impairment of either its intelligential, affective, or sensorial attributes. Had mental unsoundness been present at all times in these men, the application of this cause would seem to be more easy; but the history of most of the patients shows, that at one period they, to all appearance, enjoyed a healthy condition of the mental faculties. Though a disparity between the two sides of the brain does not produce, of necessity, a lesion of, or a want of unison, in the functions of the mind, yet that it does lay the foundation for such disorder seems pretty certain. Of these 64 patients, 28 laboured under Mania Chronica, 4 under Mania Intermittens, 6 under Melancholia, 7 under Dementia, and 19 were the subjects of congenital weakness of intellect. From observations of the heads of other classes, these malformations of the skull appear to be much more common in the grade from which soldiers are drawn, than in a higher circle; and it is possible that they may be the result of injuries received during the period of pregnancy, either from violence, hard work, or other causes, or of rough treatment in the stage of parturition, to all of which persons in the lower class are subject. These malformations may, however, begin after birth; as, for instance, among other causes, from early osseous union of the sutures of the skull preventing the natural growth of a bone, and there being a compensating expansion in the direction where such has not occurred. As about 20 per cent. of the admissions here labour under this defect of the skull, the subject is deemed worthy of this special notice.

Table No. 5 shows men in whom other defective development of the Cranium existed. In these cases the most marked features were small measurements, longitudinal, transverse, and spherical; low, narrow, and receding foreheads; conical, wedge-shaped, pear-shaped, elongated heads, badly arched, or quite flattened at vertex; or the skull was preternaturally large, and at times hydrocephalic in character.

TABLE No. I.

Showing the Admissions and Discharges during the past Year.

Diseases.	Remained, 31st Dec., 1860.	Since admitted.	Total treated.	Discharged to							Total discharged.	Died.	Remained, 31st Dec., 1861.
				Friends.	Duty.	Asylum.	St. Mary's, to await discharge invalided	Medical Division.	Parish Authorities.	Civil Power.			
Mania Acuta ..	..	2	2	..	..	1	..	1	..	..	2	..	..
„ Intermittens	..	10	10	9	..	..	1	..	..	..	10	..	..
„ Chronica ..	10	99	109	49	..	45	..	1	1	1	97	..	12
Monomania ..	2	9	11	8	2	..	..	..	..	..	10	..	1
Melancholia ..	3	21	24	12	2	7	1	..	..	..	22	..	2
Mania et Paralysis	..	1	1	1	..	..	..	..	..	..	1	..	..
Dementia ..	4	57	61	36	4	8	8	..	1	..	57	..	4
Dementia et Paralysis	..	3	3	1	..	2	..	..	..	..	3	..	..
Dementia et Epilepsia	..	4	4	2	..	1	1	..	..	..	4	..	..
Paralysis	..	1	1	..	..	..	..	1	..	..	1	..	..
Epilepsia	..	2	2	1	..	..	1	..	..	..	2	..	..
Psellismus ..	..	1	1	..	..	..	1	..	..	..	1	..	..
Fatuitas	1	56	57	36	..	1	17	..	..	..	54	..	3
Dysecœa	..	1	1	..	..	..	1	..	..	..	1	..	..
None apparent ..	1	22	23	1	11	..	7	2	..	..	21	..	2
Total ..	21	289	310	156	95	65	38	5	2	1	286	..	24

TABLE No. II.

Showing Patients who have required Forcible Feeding.

Number of Patients.	How Feeding effected.	Aggregate No. of days necessary.	Longest time with one Patient.	Remarks.
5	Beef-tea, &c., given with a spoon. Patient's mouth kept open merely with a perforated piece of wood.	14	5	This plan, although tedious, proved successful, and has obviated the necessity for using the stomach-pump, &c., always difficult with violent or obstinate patients.

TABLE No. III.

Showing the Number of Patients in Seclusion.

No. of Patients.	Aggregate No. of Hours of Seclusion.	Average No. of Hours.	Longest time (Hours).	Remarks.
42	184	4	30	In one case the maniacal excitement of the patient was so increased by the presence of his comrades, that prolonged seclusion became necessary, and acted most beneficially.

TABLE No IV.

Showing Patients in whom want of Symmetry between the Sides of the Head existed.

Regiment.	Name.	Remarks.
44th	Thomas Roberts ..	Sides of head not symmetrical; narrow behind.
67th	Keerem Curley ..	Cranium not symmetrical; left side flattened.
50th	Alex. Taylor ..	Cranium unsymmetrical; left side flattened. (Best seen from behind.)
58th	Christus Seward ..	Formation of head peculiar; conical, and flattening of right side posteriorly.
88th	Thomas Coneely ..	Sides of head not symmetrical; left flattened. (Best seen from behind.) Cranium conical.
71st	William Gibson ..	Formation of head irregular; sides not symmetrical; right side posteriorly flattened.
72nd	Jeremiah Sullivan	Cerebral development preternaturally large; cranium not symmetrical.
2 | 10th	Alex. Frazer ..	Formation of cranium irregular; sides not symmetrical; head conical.
2 | 6th	Thomas Parkinson	Not symmetrical; flattened at sides.
2 | 2nd	Richard Day ..	Head not symmetrical; otherwise peculiarly shaped, and conical.

Table No. IV.—*continued.*

Regiment.	Name.	Remarks.
M. S. C.	Thomas Olley ..	Formation of cranium peculiar; sides not symmetrical.
1 | 24th	Daniel Watson ..	Head not symmetrical.
R. E.	James Guthrie ..	Cranium unsymmetrical, and irregularly formed in other respects.
R. A.	James Gow ..	Head unsymmetrical. (Best seen from behind.) Development otherwise indifferent.
1 | 6th	John Callaghan ..	Formation of cranium not symmetrical; bulging of left side. (Best seen from behind.)
70th	Thomas O'Donnell	Formation of cranium not symmetrical, and development in other respects peculiar.
70th	Denis Cussan ..	Head not symmetrical; flattened on right side.
1 | 5th	Daniel Pritchard ..	Cranium unsymmetrical. (Best seen from behind.)
34th	James M'Clure ..	The same.
1 | 60th	John Lowe ..	The same.
2 | 13th	Arthur Hutchence	Formation of head peculiar; pear-shaped and unsymmetrical. Encephalic development exaggerated, and resembling the formation usual in hydrocephalus.
R. A.	Samuel Garrett ..	Formation of cranium unsymmetrical; right side flattened.
97th	John Ashley ..	Cranium not symmetrical.
83rd	Edward Brady ..	Cranium unsymmetrical; left side flattened; (evident from behind and before).
83rd	John Brown ..	Cranium unsymmetrical; bulging to left side. (Best seen from behind.)
2 | 60th	William Pate ..	Ditto; left side bulging; right flattened.
44th	John Brown ..	Cranial development low; unsymmetrical, and faulty in most respects; brain altogether very small; left side flattened posteriorly.
1 | 19th	Andrew J. Glover	Formation of cranium irregular, unsymmetrical, and conical; depression of the outer table of skull, the result (he says) of a blow from a hatchet before enlistment.
80th	William Platts ..	Cranium not symmetrical, and development indifferent; measurements small.
61st	Charles Light ..	Cranium indifferently developed and unsymmetrical; slight bulging of right side posteriorly; rather conical; measurements small.
1 | 20th	Walter Barlow ..	Formation of cranium faulty in many respects; forehead narrow and receding; wedge-shaped towards vertex, and not symmetrical; right side flattened posteriorly.
C. M. Rifles	Benjamin Prince ..	Cranial development low, and not symmetrical; right side flattened. (Seen from before and behind.)
88th	James Dempsey ..	Formation of cranium unsymmetrical; right side flattened; forehead receding.
77th	Peter Henretty ..	Cranium not symmetrical, and development indifferent.
27th	George Gorman ..	Formation of cranium peculiar; head conical, and not symmetrical.
R. N. Co.'s	Crofton Williams..	Cranium badly developed, and unsymmetrical. Measurements small.
46th	William Collins ..	Cranial development peculiar; frontal portion prominent; posterior part narrow and unsymmetrical.
1 | 17th	Patrick Murphy ..	Cranium not symmetrical; right side flattened, and pressed in above the ear especially, and projecting above this point. Deformity very evident before and behind.

Table No. IV.—*continued.*

Regiment.	Name.	Remarks.
1 | 24th	John Martin.. ..	Formation of cranium wedge-shaped and peculiar; unsymmetrical; right side flattened.
2 | 4th	John Wright ..	Decided malformation of cranium; want of symmetry between sides of head; skull otherwise badly developed.
2 | 4th	Charles Roden ..	Configuration of skull irregular and defective; conical and unsymmetrical; right side flattened, and even indented above ear.
77th	Daniel Thompson	Formation of cranium defective in several points; development low; measurements small; shape unsymmetrical; left side larger than right.
94th	Thomas Mardell ..	Cranial development low; forehead narrow and receding; head unsymmetrical.
73rd	Henry Wallace ..	Cranium flat at vertex and unsymmetrical; well seen from behind and before; depression of skull.
100th	John Toole	Formation of cranium peculiar; elongated backward; conical and unsymmetrical.
R. A.	James Gray	Formation of cranium peculiar; forehead receding, and head unsymmetrical.
100th	John Dogherty ..	Cranium markedly unsymmetrical; bulging towards left side.
R. A.	Thomas Holborn ..	Configuration of cranium irregular and unsymmetrical.
Bengal Hussars.	James Riddell	Formation of cranium irregular and unsymmetrical, especially posteriorly.
2 | 4th	Samuel Bignell ..	Cranial development deficient, and conformation unsymmetrical.
43rd	George Haslar ..	Cranium unsymmetrical; best seen behind, where it becomes flattened on right side.
1 | 19th	John Baker ..	Cranium defective in several particulars; head generally large, and the encephalic portion relatively small; wedge shaped, and unsymmetrical.
2 | 6th	Charles Morland ..	Cranial development bad and unsymmetrical; measurements small.
2 | 6th	William Guildhurst	Configuration of cranium defective; measurements small; head flattened; forehead very receding, and want of symmetry between the two sides of skull.
R. A.	Thomas Morris ..	Formation of cranium unsymmetrical.
77th	Samuel Cresswell ..	Head flat, and not symmetrical; arch of vertex acute.
97th	Daniel Mahoney ..	Cranium unsymmetrical and flattened; forehead receding.
41st	Stephen Bradley ..	Cranium unsymmetrical, and forehead receding.
97th	William Carne ..	Cranium very peculiarly formed; narrow posteriorly, and unsymmetrical; flat at vertex; ears projecting.
3 | R. B.	John Westerman..	Cranium not symmetrical.
1 | 16th	John Hayes ..	Cranium badly developed, and unsymmetrical. (Best seen from behind.)
R. A.	John Boal	Formation of cranium faulty; forehead flat and receding; head conical, and unsymmetrical.
2 | 12th	Stephen Yates ..	Cranium badly developed and unsymmetrical; face also unsymmetrical; forehead narrow towards vertex.
R. A.	William Spelling ..	Cranium unsymmetrical, and development low.

TABLE No. V.

Showing Patients in whom other Defective Development of the Cranium than that noticed in the foregoing Table existed.

Regiment.	Name.	Remarks.
1 | 2nd	Francis Casey ..	Forehead low and receding; head conical.
R. A.	Robert Young ..	Formation of cranium defective; forehead narrow and receding.
37th	Bryan McTeer ..	Cranium peculiar; head conical posteriorly; flat at top of forehead.
R. A.	William Beveridge	Formation of head indifferent; forehead narrw towards vertex.
3 Rif. Brig.	John Brown	Head conical.
1 | 22nd	Robinson Ellis ..	Ditto.
1 | 1st	Richard Neil ..	Formation of cranium indifferent; forehead low and narrow; head conical.
95th	George Short ..	Formation of cranium defective; forehead narrow and receding.
2 | 7th	Thomas Paul ..	Head conical.
1 | 7th	Joseph Hoxton ..	Forehead low and receding; cranium very conical; development of anterior portions of brain very defective; ears large.
1 | 20th	Matthew Hurley ..	Cranial development indifferent.
S. F. Gds.	James Hazzard ..	Formation of cranium peculiar; narrow and elongated.
41st	Patrick Gainor ..	Formation of cranium peculiar, irregular, and badly developed.
53rd	Thomas Burke ..	Formation of cranium peculiar; forehead receding, and head rather conical.
6th Drags.	Robert Taylor ..	Cranium peculiarly formed.
51st	Joseph Brady ..	Ditto ditto.
53rd	Samuel Burgess ..	Cranial development faulty; forehead flat and receding; head generally flat and elongated.
3 Rif. Brig.	Thomas Ryan ..	Formation of cranium indifferent; forehead low and receding; measurement small.
1 | 20th	John Stone	Cranial development defective; wedge-shaped, and forehead receding; measurements small.
40th	Frederick Kennedy	Formation of cranium peculiar; an extensive cicatrix of wound on right side and back of head, with considerable depression of occipital and parietal bones, the result (he states) of a fall from a horse, when a youth.
65th	Arvin Haaze'	Formation of head irregular; several scars on scalp, but no injury of bones.
27th	Felix Leonard ..	Cranium wedge-shaped; forehead narrow.
	Bernard Donnelly	Cranial development low; measurements small.
1 | 18th	William Ferguson	Formation of cranium low and defective; forehead narrow and receding.
63rd	William Lamb ..	Cranium peculiarly formed; narrow; several cicatrices of wounds.
58th	John Collins	Formation of cranium indifferent, and measurements small.
2 Dr. Gds.	John Kay	Several cicatrices of severe wounds of scalp, and slight depression of outer table of cranium, the result (he says) of an injury by the falling of an iron "tripod" on him, before enlistment.
46th	Edward M'Avoy ..	Cranial development indifferent; measurements small; forehead narrow.
R. A.	John Hamilton ..	Cranial development peculiar; occipital protuberance large.
41st	Thomas Lally ..	Formation of cranium irregular; measurements small.
1 | 10th	John Cardwell ..	Formation of cranium peculiar; narrow and wedge-shaped.

Table No. V.—*continued.*

Regiment.	Name.	Remarks.
1 | 21st	William Emmett ..	Cranium peculiar; forehead narrow and receding; head largely developed posteriorly.
100th	William Harnett ..	Formation of cranium indifferent; forehead low and receding.
9th Lancers	John Shea	Cranial development low and faulty.
29th	James Newsham ..	Formation of cranium peculiar; vertex flat, elongated backwards.
1 | 23rd	David Norton ..	Formation of cranium defective; forehead low, narrow, and receding; measurements small.
2 | 8th	Thomas Poole ..	Head conical and wedge-shaped.
1 | 15th	Amos Hemming ..	Formation indifferent; forehead narrow and low; measurements small.
R. A.	Hugh Smythe ..	Cranial development low; forehead receding.
R. E.	William Coughlan	Formation of cranium defective; wedge-shaped; forehead receding.
2 | 4th	James Fagan. . ..	Configuration of cranium peculiar; conical, and forehead receding.
65th	Patrick Horan ..	Cranial development defective; head narrow and conical.
R. E.	Abel Harvey. . ..	Forehead receding; vertex extremely flat.
99th	James O'Hagan ..	Formation of cranium peculiar; forehead prominent; vertex flattened.

NOTE.—The portions of this Report which have been omitted refer to matters of economy and routine. H. M.

EXTENSIVE ABSCESSES IN BOTH KIDNEYS.

By Dr. W. RUTHERFORD, Deputy Inspector-General.

The subject of the above unusual complication of disease was a young soldier of the 1st Battalion, 18th Regiment, private William Mullen, who, enlisting on the 31st January, 1856, in due course of service proceeded to India; from whence, after an interval of nearly three years, he was invalided to England on account of impaired health consequent upon repeated attacks of dysentery and intermittent fever, with an obstinate stricture of the urethra, the result of gonorrhœa, and from which he appears to have suffered for a considerable period. This latter affection, owing to his then weak and shattered state of health, was considered at that time "not amenable to treatment by operative interference."

After a certain amount of treatment at Chatham, he joined the depôt of his regiment at Buttevant, on the 27th of June, 1861; shortly after which he proceeded on furlough for two months, returning on the 1st of September to his duty, which he continued performing until the 17th, when, owing to a recurrence of his previous diseases, viz., intermittent fever and stricture, he was admitted into the battalion hospital.

He stated that his first attack of "ague" occurred in 1859, while on the line of march to Secunderabad, and that he afterwards had repeated recurrences of the affection—one during the period of his absence on furlough. It was, moreover, ascertained that he had suffered for a very considerable time from

obstinate and close stricture of the urethra, with much difficulty of micturition, sometimes amounting to complete retention; the more urgent symptoms of which were usually relieved by the ordinary treatment, although all attempts at introducing an instrument into the bladder had apparently been unsuccessful.

At this, the period of his last admission, the symptoms of retention of urine, accompanied by much pain, straining, and repeated rigors, were very urgent. The ordinary remedies were had recourse to, and relief obtained in great measure, by the urine flowing "guttation," all attempts at introducing an instrument having failed, until the 9th October, when a very fine catheter, with much difficulty, was fortunately passed, and a considerable quantity of urine drawn off.

From this period he continued free from positive retention, although the usual difficulty and frequency of micturition continued; the quantity of urine secreted, as far as could be computed, appearing natural. It was, however, clouded in appearance, contained a certain quantity of mucus, gave an alkaline reaction, and had a specific gravity of 1020. No purulent matter was observed in it at any time.

He continued, without any important change, until the 16th October, when pain of a dull, throbbing character was complained of in the hepatic region, where, upon examination, a tumour about six inches in diameter, the centre corresponding to about the posterior extremity of the cartilage of the eighth rib, was observed. Its surface was flat, rather indurated, without fluctuation, although tender to the touch. It now rapidly increased in size, and the constitutional symptoms, with daily rigors, became more marked, and of a more typhoid character. On the 19th, in addition to this increase of the size, the surface of the tumour began to assume a somewhat livid colour, particularly about its centre; but, as yet, no fluctuation was discoverable. On the 22nd, no favourable change had occurred: on the contrary, the size and lividity of the tumour had increased, the accompanying rigors and "burning" sensation continuing. He was free from cough or pleuritic pains, and although stimuli and nourishing diet were freely administered, he daily became more feeble and depressed. No fluctuation was, as yet, discoverable.

On the 26th of October, although the tumour, now about ten inches in diameter, had not lately sensibly increased in size, it had become softer and of a more livid appearance, presenting about its centre a sense of deep-seated fluctuation. The constitutional symptoms became more alarming, his countenance assuming a more sunken expression; the tongue was brown and dry, surface hot; pulse 110, small, and compressible. He lay on the left side, without cough or expectoration. Urine was passed with some difficulty, and, saving a more clouded appearance, presented nothing unusual.

Under all these circumstances, and taking into consideration the facts that the patient had served, and suffered much from disease in India, &c, it may not be considered inexcusable if the abscess, now evidently existing, was supposed to be connected with the liver.

On the night of the above day, unaccompanied by cough-pain or dyspnœa of any kind apparently, a sudden "flow" of purulent matter took place from the mouth; in quantity, as far as could be guessed, about 8 oz.

On the morning following this discharge, an incision was made into the most prominent point of the tumour, the situation of which corresponded to the spot when a line drawn from the right nipple to the anterior spinous process of the ilium, passed over the interval between the eighth and ninth ribs. By this incision a small quantity of thick, grumous matter (exactly similar in appearance to that expectorated) was given exit to. No air was observed to pass through the opening.

Little or no relief to the more urgent symptoms, however, ensued. The quantity of matter escaping through the opening in the side during the remaining two days of his life was considerable, and may be estimated at 10 or 12 oz.; and, in proportion to its discharge, so the quantity by the mouth diminished, until the 28th, when the latter finally ceased.

Notwithstanding the free discharges thus established, the patient continued to sink gradually. He fell into a semi-comatose state, from which, however, he could in some measure be roused. Involuntary evacuations from the bowels

and bladder occurred, and he finally sank on the 29th of October, at 1 o'clock A.M.; having continued to suffer, to within a few hours of his death, from intense pain in the seat of the abscess.

The following were the appearances presented by the post-mortem examination, nine hours after decease :—

Body.—Not much emaciated. Marks of leech-bites over the hepatic region, and a livid discolouration of the integuments over the right side, extending from about the fifth rib to near the crest of the ilium, and from the middle line in front to the angles of the ribs behind, were observable.

Head.—Not examined.

Pericardium and its contents.—Normal.

Right Lung.—Superior and middle lobes healthy. A very considerable portion of the lower lobe was connected by recent adhesion to the diaphragm and parietes of the thorax, as high up as the sixth rib. The parenchyma of the organ in this situation was considerably disorganised, and infiltrated with purulent matter. On raising it from the surface of the diaphragm, an abscess was discovered communicating with the bronchial tubes superiorly, with the external abscess (already described) laterally, and inferiorly through an opening in the diaphragm with an abscess in and around the corresponding kidney.

Left Lung.—Saving some post-mortem congestion posteriorly, no abnormal appearances presented themselves in this organ.

Abdomen.—Peritoneum free from any inflammatory appearances.

Stomach, Spleen, and Intestines.—Healthy.

Liver.—Somewhat enlarged. Structure apparently free from disease.

Right Kidney.—Was found, in some measure, buried in a mass of adhesions posteriorly, mixed up with purulent matter. The cortical structure of the organ contained a number of small abscesses, one of which, larger than the others, and about the section of a hen-egg, communicated with the collection of matter in the surrounding cellular membrane. The kidney was nearly twice its natural size; vascular and friable; the cortical and tubular portions being scarcely distinguishable from each other. None of the abscesses communicated with the calices or pelvis of the organ. On endeavouring to trace the course of the matter, it was found that the largest of the abscesses of the kidney communicated directly with another external to the organ; from thence, along the crura of the diaphragm, posterior to the liver, it found its way into the right pleura, and ultimately into the bronchial tubes; and externally as already described.

The perforation in the diaphragm occurred in the muscular portion, about the centre of its right lateral half, was oval in shape, and about an inch long, antero-posteriorly.

Left Kidney.—Somewhat larger than natural. Several very small circumscribed abscesses, about the size of peas, were found in the cortical structure. The tubular arrangement was distinct, although the mucous lining of the calices, &c., was vascular. No calculi were found in any of the urinary organs.

The Ureters.—The mucous membrane appeared vascular. Calibre little altered.

Bladder.—Size not perceptibly altered. The lining membrane was vascular and thickened, and the muscular structure hypertrophied. It contained a few ounces of urine, mixed with mucus.

Urethra.—A close, semi-cartilaginous stricture was found in the membranous portion, through which a small silver probe could scarcely be passed.

CASE OF COMPLETE TRANSFIXION OF THE ABDOMEN BY A BAYONET—RECOVERY.

By Staff Surgeon R. C. Todd, Army Medical Department.

Private John C——, aged 25, a healthy and vigorous man, joined the 99th Regiment as a volunteer for the China war, on the 17th January, 1860. He had served with the 53rd Foot during the Indian mutiny, generally enjoyed good health, and had never been wounded.

He was employed in the police, and while riding through the camp on the 3rd September, his pony became refractory, and threw him, and in the fall his bayonet, which had dropped from the scabbard, entered his back, about two inches to the left of the last dorsal vertebra, passed directly through the abdomen, and re-appeared about two and a half inches to the left, and below the umbilicus. The weapon was at once withdrawn by Staff Assistant-Surgeon Sainter, who happened to be present. I saw him a few minutes after the accident, when he was perfectly calm and collected, and did not complain of pain. Pieces of wet lint were applied to each wound, and secured there by a bandage. The man was then placed on a stretcher, and carried to the hospital tent of the 99th Regiment. Sixty drops of laudanum in some weak brandy and water, was administered, and repeated in about four hours afterwards. On the following morning he complained of sickness of stomach, and inability to micturate. A little arrow-root and brandy, which was given him, was instantly vomited. The laudanum was repeated, and perfect rest, as far as possible, enjoined;—a difficult condition to secure on the line of march, as the patient had to be carried in a dhooly. In consequence of a heavy fall of rain the division did not march until after 11 A.M.; this gave the patient seven hours more rest than he otherwise would have had; still, the day's journey was very distressing to him, as he was in the dhooly from 11 A.M. until after 5 P.M., when we halted for the night. He bore the journey well. Arrow-root and brandy had been administered during the march, and the irritability of the stomach was greatly allayed. As he felt no desire to make water a catheter was passed, and a large quantity of urine drawn off, which appeared healthy, and was totally free from all traces of blood. He had no pain. His tongue was clean. His pulse was sixty-two. The bowels had not acted since the accident.

On the next morning, at 4 o'clock, the Army advanced, and before proceeding, the patient received a cup of arrow-root, with about an ounce of brandy in it. At 9 A.M. we halted on the road near Tien-tsin; the sun was excessively powerful, and C—— complained much of the heat. During this time it was considered advisable to give him more than one dose of brandy and water, as it was 2 o'clock before the tents were pitched, and the patient made comfortable.

In Tien-tsin we found ice in abundance; grapes and eggs were also plentiful. Cold-water dressings were applied to the patient's wounds, with a piece of lint; and he was permitted to eat some grapes, and the beaten up yolk of an egg. The bladder recovered its tone, but the bowels had not acted; a luke-warm water enema was therefore administered, and a little feculent matter was washed away, but the bowels did not act. The next day was a halt, and a table spoonful of castor-oil was given, beaten up in the yolk of an egg. A few hours after the bowels acted very favourably twice; neither evacuation caused pain, or presented any trace of blood.

On the 8th September, five days after the injury was received, the regiment advanced through Tien-tsin, towards Pekin; the patient was therefore left behind in charge of Dr. Little, Royal Marine Light Infantry. In a few days afterwards the Marines also marched, and he was transferred to the General

Hospital. He was then quite convalescent. On the 28th of the following October, I saw him in Tien-tsin, on my return from Pekin, at which time he looked pale, but was in good spirits; his digestion was good, his tongue clean, and his bladder acted perfectly. The wound in the back was covered by a small scab; that in the abdomen had quite healed, and left a small triangular cicatrix. He complained that he sometimes had "a drag in his belly," when he straightened himself up, and also when his bowels were costive, but that "generally they were rather free." In other respects he was quite well.

In this case it is clear that the weapon passed through the abdomen without injuring the intestines, or any other important part, except the peritonæum.

In the "Medical Times and Gazette," of the 6th of May, 1854, there is a somewhat similar case recorded by Mr. Gallwey, of the Artillery.

CASE OE EXCISION OF THE KNEE JOINT FOR SCROFULOUS DISEASE OF THE BONES.

By Staff Surgeon T. W. Fox, M.B., Army Medical Department.

Henry Flavin, aged 5 years 10 months, the son of a soldier in the Royal Canadian Rifles, at Quebec, had suffered for about fifteen months with scrofulous disease of the right knee joint, which gained ground in spite of every constitutional and local remedy, and eventually threatened both the child's limb and life. Constant pain and restlessness impaired the general health; the face was thin and anxious, and the body very weak and emaciated; the leg was flexed back on the thigh, the hamstring muscles firmly contracted; any movement of the knee caused extreme pain, the joint was swollen and painful, and numerous sinuses existed, and discharged thin seropurulent matter. The probe, when introduced through these, grated against carious bone. Amputation, or resection, was the only alternative. I performed the latter on February 3rd, 1861. Chloroform having been administered, a slightly curved incision was made across the front of the joint, from condyle to condyle, just below the patella; the joint was laid open, the crucial ligaments were carefully divided on a director, to avoid the popliteal vessels, which are extremely near in a young child. It was found necessary to saw a slice nearly an inch thick off the femur, which was done from behind forwards, by a butcher's saw; a thin slice was next taken off the tibia, but the caries having eaten more deeply into the structure of that bone, another portion had to be sawn off—in all about an inch in depth. The whole of the patella, although healthy, was next removed, as recommended by Fergusson and others.

The cut surfaces of both bones were approximated as soon as the hæmorrhage, which was profuse, had been checked. The soft parts were brought together by fine sutures, and the limb, loosely bandaged, was placed in a nearly straight position, on a padded splint. The patient was then removed to bed, and ordered five drops of laudanum, and a little port wine occasionally. On the fourth day after the operation it was necessary, to keep the limb in a straight position laterally, to use a box with moveable sides. The box was well padded, especially under the upper end of tibia, which was inclined to sink below the level of the femur. The patient, still very weak, was ordered cod-liver oil, citrate of iron and quinine, and milk diet, with mutton chops and port wine. On the 29th February the wound had nearly healed, although a small sinus near the upper and inner part of tibia discharged a large quantity of pus. The health was much better, and sleep and appetite improved. On the 4th March the limb was put up in pasteboard, with starch bandage outside, with opening at knee through which to dress the sores, which were still open.

March 15th.—Great difficulty in keeping the limb in proper position, owing chiefly to the open sores; a narrow splint is now applied behind the knee, and also a long straight splint from axilla to heel.

March 23rd.—Owing to fresh sores round the joint the long splint had to be removed; the limb is now supported by the narrow back splint only. In April and May the progress of the case was slow, owing to the amount of strumous cachexia, and periosteal abscesses above and below; and the necessary changes of appliances for keeping the limb in position consequent thereon. In June and July the health had so far improved, that although two small sores were still open, the child had become strong, plump, rosy and cheerful, and in the latter month was able, with a high heel to his boot, to walk about firmly without a stick, the limb being nearly straight, and the joint, or rather the bones at the knee, firmly consolidated.

March 24th, 1862.—The child is now in excellent health, and actually running about with the other boys, as happy and ruddy as any of them, and without even a very thick shoe, and the (formerly unsound) leg is only two inches, or less, shorter than the other. This appears to me of some importance, as it has been stated in medical writings, that in cases of resection of the knee in childhood, the growth of the limb is checked, and the shortening so great, as to render the leg useless, or nearly so.*

CASE OF UNUNITED FRACTURE OF TIBIA AND FIBULA.

By Surgeon J. M. S. Fogo, R.A.

A STRONG healthy-looking soldier, aged 25; of three years' service; an agricultural labourer before he enlisted.

On the 25th of July, 1859, at Norwich, while at gun-drill, and seated on a limber-box, the gun-carriage and limber were overturned, and he suffered fracture of the left leg. The tibia was broken transversely at the junction of the middle with the lower third, and the fibula three inches lower down, about three inches from the ankle-joint. The limb was put up in the usual way on Liston's double-inclined plane splint, where it was kept for ten weeks.

On the removal of the splint, it was discovered that the tibia had not united firmly; but that perfect union by bone had taken place between the broken ends of the fibula. There was a trace of syphilitic skin disease, and syphilis was conjectured as the cause of non-union.

He was ordered to Woolwich, and arrived on the 16th of February, 1860. The leg was encased in pasteboard splints, and a mixture of the iodide of potassium and syrup of the iodide of iron was ordered, with nutritious diet and plenty of green vegetables.

4th April, 1860.—The pasteboard splints were removed. Noted, that there was no attempt at union of the tibia, and the splints were replaced to allow his health to improve farther.

2nd May, 1860.—Starched bandages were carefully and strongly applied instead of the pasteboard splints.

* "The lower extremity of the thigh-bone continues to grow towards the knee-joint long after the bone has ceased to grow towards the hip-joint; while the upper ends of the principal pieces of the leg bones continue to grow towards the knee-joint for a considerable time after growth has ceased towards the ankle-joint." * * * "Excision of the knee-joint * * * is more often followed by decided shortening of the limb, because at the knee-joint growth chiefly advances." Aitken "On the Growth of the Recruit." London, 1862. Page 40.

1st June, 1860.—The starched bandages fitted well, and he was desired to walk about on the leg a little. The eruption was gone, and there was no trace of syphilis.

19th July, 1860.—The bandages were again removed, and it was discovered that no more union by bone had taken place, but that the fractured ends of the tibia did not admit of the same extent of motion as before; probably from the formation of fibrous tissue.

1st August, 1860.—No real good having resulted from the prolonged application of the starched bandage, the medical officers of the garrison determined, in consultation, that an operation of a less severe character than sawing off the ends of the bone (as recommended by Mr. Syme for false joint) should be performed; more particularly as Mr. Syme's operation was considered unjustifiable in the present instance, in consequence of the fibula being sound.

3rd August, 1860.—The operation was performed, and consisted in introducing a long strong subcutaneous cutting knife (made for the purpose) under the integument, an inch from the seat of fracture, getting it between the ends of the bone, cutting through any fibrous tissue that had formed, and incising the ends of the bone so severely as to induce inflammation. The leg was afterwards put on a double-inclined splint, which was kept applied for six weeks.

Ten days after the operation, abscess formed about the seat of the inflammation that was set up. The pus found an easy means of exit by the recently before made wound on the introduction of the knife. The abscess was emptied twice or three times by pressure with the hand, and closed satisfactorily. From some cause phlegmonous erysipelas attacked the limb below the seat of fracture, and gave rise to great constitutional disturbance. Before discovered, as it was hidden by the bandages, it led to the supposition of the existence of pyæmia. Free incisions were made, he was put on brandy and beef-tea, and this complication terminated satisfactorily.

15th September, 1860.—The splint was removed, and the bone was discovered to have united; he described it himself to be "quite firm," and he could now rest his weight on the leg, although the muscles were much reduced.

31st October, 1860.—He was discharged from hospital to convalescent duty, to recruit his strength.

The case was most gratifying, as the bone seemed to have completely united by bone, although it was not quite straight. The knee and ankle were recovering from the stiffness produced by the lengthened application of splints and bandages, and it was expected that he would have a useful and strong leg when the muscles had again become well developed.

19th February, 1861.—As the leg is not quite straight, and he complains of it giving under him sometimes in walking over the rough pavement of the stables; also, as he can always make it the means of evading any duty; he was brought before a Medical Board, and discharged from the service.

14th July, 1862.—After his discharge from the service, he obtained a situation on a railway, and now writes to his old comrades that he is a luggage porter, and is quite strong on the leg.

REPORT ON FEVER (MALTA).

By Assistant-Surgeon J. A. Marston, M.D., Royal Artillery.

This Paper was written during the winter of 1860, and forwarded to the Army Medical Department the following summer. Revised 1863.]

During the year 1859, the garrison of Malta suffered severely from the epidemic prevalence of typhoïd or enteric fever. It is proposed to devote the present Paper to the subject of Fever generally, as an army disease, and to the forms of fever incidental to troops serving in the Mediterranean, using the records of the Royal Artillery Hospital, as a text only, on which to base the whole amount of my experience and observation.*

I have been led to this subject from several considerations; viz., the experience I have had of this class of diseases in Great Britain and abroad; the special attention I have been obliged to give to fever, as a disease of this station; the importance of fever (in its generic sense) as an army disease†; the causes affecting its prevalence; the relations which fevers of this climate bear to those observed at home; and the modification of the symptoms induced by climateric influences.

From inquiries that I have instituted, it appears that fever generally—and the enteric form in particular—prevails more amid the troops than the natives of the Island.

Table of Fever for the Half Year ending December 31st, shewing the Strength of the Garrison, Admissions, and Mortality, during different Years.

		Strength of Garrison.	Number of Fever Cases treated.	Mortality.
From July 1st to December 31st	1850	2,842	414	2
	1856	9,331* / 4,163	2,464	15
	1858	6,305	766	8
*Expeditionary Force to Crimea	1859	6,744	1,196	41

The increased mortality of 1859 was entirely due to Typhoïd fever.‡ In the total number of fever cases (1,196) for the half year 1859, are included the trivial febriculæ as well as the typhoïd form. The former must always predominate; say two-thirds of the total cases treated were not typhoïd in character.

* Typhoïd fever alone is the cause of a larger number of deaths than any other acute malady, perhaps, in the civil as well as military population.

† As far as possible, I made a point of seeing all the cases of fever—whether occurring among the troops or inhabitants—and of being present at the post-mortem examinations.

‡ In the last Army Medical Blue Book (1859), I find, that the strength was 5,310 (excluding the Malta Fencibles), and the mortality was 19·02 per 1,000. Of 101 deaths, 59 were from miasmatic disease. Contrasted with other years, there was a marked increase in miasmatic, and a decrease in tubercular disease, as regards mortality.

Table of Cases of Fever treated in Royal Artillery during the Half Year ending December 31st, 1859.

	Total Strength.	Total Number of Cases of Fever of all Types.	Specific Fever. Typhoïd.	Mortality.
Royal Artillery	750	170	48	7
Royal Engineers	286 } 1,036			
Out-Patients (including Officers, their Wives and Families, the Women and Children of Brigade, and the attached Departments)	..	..	13	2
Total	..	..	61	9

Hence the mortality from fever during the half year has been 7 per 1,000 living; and, of the Typhoïd fever cases treated, the mortality has been about 18 per cent.

The term "Continued Fever" has, unfortunately, hitherto been made to embrace all the varieties of fever, while typhoid has been used to indicate not only fevers, having symptoms denominated "low," but that stage or state also of any disease, in which great prostration of the nervous and vascular systems existed.

It seems to be tolerably certain that four forms are seen in Great Britain. 1. Febricula, or Ephemeral Fevers. 2. Relapsing. 3. Typhus. 4. Typhoïd, Enteric, or Pythogenic; to which I would add, 5th, Gastric Remittent Fever —very prevalent in the Mediterranean,—and, 6, Bilious Fevers—far less common.

The non-identity of the Typhus and Typhoïd forms of fever seems to me to be a question definitively set at rest. The geographical distribution of the two diseases differs; for typhoïd is found in tropical zones, while typhus is not. Parallel with this is the fact, that typhus prevails in winter, typhoid or enteric fever in autumn. It would be needless to enlarge tediously upon the marked differences between the two fevers as regards exanthem, symptoms, etiology, and pathology, as they have been so fully set forth in Dr. Jenner's philosophical treatise upon Fever.

In the winter of 1855-6, a typhus fever patient was admitted into the Military Hospital from a transport from the Crimea. Of that disease he died, and two attendants upon him took the fever, one of whom died. The symptoms, exanthem, and the post-mortem appearances, removed all doubt as to the nature of the disease. Quite recently (April 1861), we have had other cases of imported typhus. An Egyptian vessel ("Schah Gehald") landed its crew at Liverpool, in February last, and they apparently carried typhus wherever they went. The medical attendants and sick at the Liverpool Southern Hospital, the attendants at the public baths, and the pilot who brought the vessel into the port, were all attacked with the disease, many of them dying. The remainder of the Egyptian crew and passengers were shipped on board a French vessel, the "Voyageur de la Mer," for Alexandria. During the voyage several of the Egyptians died. The vessel put into Malta, and there landed eight of the English crew that manned the ship, suffering from typhus fever. Two of these cases proved fatal. An engineer resident in Malta, who went on board the ship to superintend some repairs required by the engines, took typhus, of which he died. The plague-stricken vessel at last reached her destination (Alexandria), carrying typhus cases with her. I personally examined the cases landed at Malta, and heard the result of one post-mortem examination, and there could be no doubt that the disease was typhus.* Whether the

* The asserted spontaneous origin of typhus on board the "Schah Gehald" is not quite substantiated to my mind. There is an absence of positive proof that none of the passengers or crew were affected on first embarkation.

climate was inimical to the spread of typhus or not, the disease did not extend in the Island. With these exceptions, I have neither seen, nor can I hear of *Typhus or true Relapsing Fever as a disease of Malta.*

All portions making up the pathology of the diseases of the summer, autumn, and commencing winter of this climate are interdependent; the diseases which follow being only a continuation of those which preceded. They are not superimposed, but congeners forming interlaced links of the same chain. They intermingle with each other, are co-existent or successive. What is wanted is some philosophical term, or classification, which shall serve to point out the indissoluble parentage, which indicates certain morbid actions, of however different appearances, as branches of the same stem. It is noteworthy how the study of sanitary science, of late years, has tended to modify opinions relative to the "specificity" of contagious and epidemic diseases.

It requires no deep insight into the varied forms and phenomena of disease to perceive that there are connecting links uniting certain of them, by which natural groups or orders are formed. Statistics, valueless as they may prove to decide many questions, must eventually cast great light upon the etiology of diseases, and ultimately furnish us with some valuable laws (empirical they may be) by which we may group togethermany and various disorders having a common etiology. This by no means limits or excludes the doctrine of specific diseases having specific causes; but it will tend greatly to enlarge our views by giving a simple and comprehensive form to their study, by indicating how, the material agents remaining the same, we may have products and diseases modified by varying conditions and circumstances.

It is highly probable that some atmospheric conditions "beyond our ken," enter into the creation and spread of the fever poison. If within the limited area presented by a regiment or garrison we can more leisurely and exactly trace the steps of progression of a disorder, it must not be lost sight of that there are other causes and influences at work, upon a far larger scale—waves of diffused influence. In the Mediterranean the death rate averaged formerly 17 per 1,000—generally lowest at Gibraltar, and highest in the Ionian Islands. In 1859, although the total death rate at Gibraltar and the Ionian Isles had fallen considerably, yet the prevalence and mortality from fever in the latter station and Malta had risen. The same epidemic influence affected both stations contemporaneously. Upwards of 400 men out of a force, whose mean strength varied in the course of the year from 2,100 to 3,060, were attacked with fever (typhoïd ?), and 21 died in Corfu alone. At Malta the death rate rose from 16·77, (its former average), to 19·02 per 1,000; 47 fell victims to fever in that garrison, giving a mortality of 1 in 28 total fever cases. Gibraltar, upon the other hand, seemed to have escaped any epidemic influence, for in 1859 we find that the total death rate had fallen from its former average of 13·58 to 7·75 per 1,000. During the succeeding year Typhoïd fever could not be said to have prevailed at Malta in an epidemic form, it having been replaced by other and milder types of fever. Shortly after this (1860) we read of its prevalence in the capital of Austria, and in 1861 along the shores of the Spanish peninsula.

As far as Malta is concerned, we find (in 1859) the main centres of the disease localized in their former sites—Upper and Lower St Elmo and Floriana —indicating the continuance of some sanitary defects upon which the poison had fixed as a nidus.

The occurence of zymotic diseases with epidemic violence during certain years, and the absence of the same diseases during others, is a mystery recognised, but not at all explained, by calling it "an epidemic constitution of the season."

Unlike many other diseases, Typhoïd fever appears to have an intimate connection with causes generally prevailing and widely spread. It is sporadic, endemic, or epidemic at different seasons and years. The apparent tendency which the virus has to originate *de novo*, contrasts with that of other diseases; and it would appear, also, to have the power of reproducing itself independently of the subject upon whom it acts.

Among the conditions connected with the spread of Typhoïd fever, the presence of privy soil and bad drainage stand first. The products of the decomposition of these gain an entrance into the body either through the stomach by means of water, or by emanations through the lungs.

Lascaris Fort is a new building, situated upon a lower site than that upon which the city of Valetta stands. This fort was occupied by a Battery of the Royal Artillery. It was found that the drainage was imperfect and inadequate. The drains had to be opened and enlarged. The commencement of the disease in this Battery distinctly followed the opening of a sewer. The first cases of sickness occurred among the children, inhabiting a lower room in close proximity to the sewer opened. Then followed numerous cases of Typhoïd fever among the men, women and children stationed in the barrack, and the officer, who superintended the repairs of the drains, was himself attacked. Besides the cases of enteric fever, diarrhœa, dysentery, slight pyrexial disorders, with diseases of the primary assimilative organs, were very prevalent.

The drainage of Malta is confessedly very imperfect. The stone used for building purposes is a remarkably light, porous sandstone, permeable by gases and liquids. The drinking water has to be collected and retained in tanks, owing to the absence of rain during the greater part of the year. The sewer are often imperfectly cemented, and sometimes in immediate proximity to the water tanks. Many of the drains are untrapped. The common sewers of the town pour their contents into the harbour. A flux and reflux takes place in the harbours, influenced by the winds—westerly producing a rise, easterly a fall of water, according to the force with which they blow.

An officer (Royal Artillery) and his family occupied a house in Strada Reale (the principal street). The drainage of the house was bad, and the drinking water became tainted. Now, in 1860, there was an absence of Typhoïd fever and of miasmatic diseases generally in Malta. The officer's children first suffered during the winter and spring from infantile remittent fever, (gastric remittent, I believe it to have been), *not* Typhoïd fever; subsequently, one of the female servants had diarrhœa; another inmate had dysentric diarrhœa; and during the summer, the military servant was admitted with Typhoïd fever into the regimental hospital, and a female domestic went, a little later, into the civil hospital for the same disease.

Certain localities in Valetta, Floriana, and Sliema, were foci of disease, as it were. In Floriana there were two houses, occupied respectively by an officer of the Royal Engineers and Royal Artillery, with their families, of whom hardly one escaped disease of some kind. Within 100 yards of this locality is St. Francis' Barracks, where a company of Sappers (newly arrived at the station) were quartered. In this barrack cases of Typhoïd fever were of frequent occurrence during the summer and autumnal months of 1859.*

In one barrack—to which allusion will be specially made hereafter,—which occupied an isolated position, remote from city and barrack sewage, very close to the sea, and having a good fall for the drains, Typhoïd fever was, for a very long period, entirely absent; and, when it did make its appearance, it was at a late period of the year, and the disease had a very limited range of action.

The sanitary state of some of the barracks is so bad, that, in the event of a prolonged siege and their being densely populated, with the concomitant evils attending a besieged garrison, a large amount of disease would necessarily occur. Some barracks, besides being defective in their own drainage, have large town sewers opening into the sea close to them, are remarkably low in their site, damp, and of a construction incompatible with anything like good ventilation. The amount of miasmatic disease prevailing among the troops occupying Lower St. Elmo, for instance, is always large and, during the periods of epidemic prevalence of disease, it enjoys a morbid notoriety in this respect. An enquiry into the medical history of the regiments stationed here in 1859, will indubitably lead to the conclusion, that the prevalence of fever and allied diseases, and the number of severe and speedily fatal cases, bore a direct relation to the imperfect sewerage, ventilation, and lowness of site of the barracks occupied.

Here, as elsewhere, Typhoïd fever prevails during the latter part of the summer and autumnal periods; the disease appearing to commence at a time coinciding with increased temperature, stillness of the atmosphere, and the prevalence of moist S. and S.S.E. winds, and after a period of prolonged

* Floriana is alluded to by McCulloch, in his Essay on Malaria, as a district in which diseases of this type prevail.

drought. When rain descends at this season, it is of too short a duration, or insufficient in amount to remove the whole of the filth in the drains and sewers. Washing out the mere surface portion of the accumulated filth into the sea, it renders the neighbouring Mediterranean murky and stinking for considerable distances from the shore. The accession of moisture also hurries the remaining filth into rapid decomposition, and taints the various tanks and springs with the dissolved or suspended products of the sewage. Whatever may be the exact nature of the materies morbi or hypothetical poison, which is the real and proximate cause of typhoïd fever, I think we are warranted in concluding its intimate relation to a concurrence or plurality of conditions, such as impure drainage and sewage, giving rise to fœcal odours and the products of animal decomposition, at a time coincident with such barometrical and thermometrical states of the atmosphere as fit it for the reception, absorption, and subsequent deposition of miasms and malaria.

In Malta the mean temperature during June, July, August and September is nearly 80°; the atmosphere is very still, and alternately very dry or very moist, as sirocco winds prevail or not.

Here I approach what seems to me to be a necessary element in enquiries of this kind. It has been shown how, apparently, from the same localities and external causes operating, different, but allied disorders have appeared, indicating that there exist numerous diseases (distinct enough in their symptoms, pathology, and, probably, distinct enough in their specific proximate causes), which may have a common origin, and possess allied etiologies. Medical enquirers, like many philosophers (including the illustrious Bacon *), are in the habit of applying one, and generally the last standing or occurring in a sequence of causes, as *the* cause, and treating, in short, co-existences as successions of phenomena. J. S. Mill and the late Sir William Hamilton would take them all as necessary antecedents, and call them concurrent causes, or a plurality of causes. Such an assembly of causes (whatever they may be) are necessary to the production of Typhoïd fever, and if one or other of them be absent, diseases no doubt will still arise, but not *the* disease Typhoïd fever. Hence it is, that in spring and summer, diarrhœas, dysentery, or fevers occur in the very same localities and bodies of men, as in autumn and early winter furnish cases of Typhoïd.

If we perceive in Typhoïd, a fever having points of resemblance which link it strongly to the contagious exanthemata, and indicate a certain though less stable connexion with the malarious fevers, another step brings us to the febriculæ and gastric remittent types, which have scarcely any connexion with the contagious exanthemata, but a close one with the malarious fevers. Between these and the bilious remittent fevers, confessedly malarious, there seems to be hardly any difference, but one of degree.†

The mind is impelled to follow the course, and receive the conclusion that logical reasoning may produce, let it be led where it may. The proofs offered by Louis, and more recently by Dr. William Budd, compel a belief in contagion, as a logical conclusion; notwithstanding that I have been unable to trace, much less to prove, the spread of the disease here by this means. The poison, whatever it is, seems to have a very circumscribed sphere of action. It affects a certain house, and tenaciously adheres to it, not extending to the visitants, but to the residents in that house with unfortunate frequency and, apparently, requiring prolonged exposure on the part of individuals to the agents producing

* "All his statements tacitly imply the assumption, so contrary to all we know of nature, that a phenomenon cannot have more than one cause" (*J. S. Mills' Logic*). In another passage the same author points out an error in Bacon's view of the inductive philosophy, viz., "His supposition that the principle of elimination was applicable in the same sense, and in the same unqualified manner, to the investigations of coexistences, as to that of the successions of phenomena."

† Even though all the conditions necessary for the production of any given disease are apparently present, it by no means follows that the peculiar and necessary arrangement of those conditions exists. Organic chemistry affords numerous illustrations that animal and vegetable matters in a state of decomposition yield different products according to varying conditions whether meteorological, dissimilar exertants to decomposition, or other and unknown conditions.

the disease. Dr. Wm. Budd has endeavoured, in some very able papers recently published, not only to prove the contagious nature of this disease, but to fix the contagious and infectious property upon the excreta of affected individuals, classing Typhoïd, cholera, and yellow fever in the same category, viz.: ground infecting poisons. Professor Von Geitl, of Munich, has still more recently advanced an identical theory; and it must be confessed that if the theory could be made to square with all the facts, it would be a most important doctrine.

During the spread of the fever here, we have had orderlies, patients, and soldiers constantly exposed to emanations from the bodies of the patients, as well as to emanations from the stools, without a larger proportion of attacks in them than among the remainder of the troops.*

Whoever knows anything of the habits of soldiers, must be aware of how commonly they visit the latrines for the purpose of smoking where, be it remembered, the stools are emptied, and remain from 12 to 24 hours, as the flushing takes place once or twice a-day. Sometimes we have had as many as ten cases of enteric fever in a ward at the same time, and the men, whose duty it was to attend upon them, did not suffer. Three cases arose, it is true, within the walls of the Artillery Hospital. Two orderlies (whose duties brought them less immediately and less constantly in contact with the sick than any of the other orderlies, excepting the cook) became the subjects of typhoïd fever. What would otherwise have been good positive evidence of contagion, was completely destroyed by the fact that the men slept in a wretchedly small room quite away from the patients. To complete the sanitary picture, a water-closet, with its ducts, existed in a yard in immediate proximity to them, and the stench from this was always detectable, spite of frequent flushings.†

The orderlies in question were among the last attacked during the spread of the disease in the garrison, viz., in December, 1859. The third case occurred in a gunner, who had attended upon a comrade suffering from enteric fever. This would appear to be a very strong case in favour of direct contagion and, had it occurred but a few weeks before, it would have afforded direct and clear proof of contagion, because the gunner in question would then have been the first of a particular battery, stationed at a detached fort, attacked with the disorder. This fort (Tignè) is completely isolated; no stools from fever cases could have floated down a drain and lodged there, inasmuch as it is divided from the town and all barracks by a tract of the sea. Cases of Typhoïd fever, however, had been coming into hospital from that fort, for a period of one month, so that this case could be explained by reference to other causes than contagion. It is noteworthy that the battery stationed at

* Nightmen, scavengers, and others, whose duties peculiarly expose them to the effluvia from decomposing organic matters, are said to be remarkably free from attacks of enteric fever. The statistics upon which this statement is based have always appeared to me too limited in amount and inexact in their grouping to merit perfect confidence. According to Dr. Peacock's experience, workers in sewers often suffer from Typhoïd fever. It must be borne in mind that not *all* organic matter is capable of producing the virus—nay, there is every reason to infer that fœcal and sewage matters must undergo a certain decomposition before they can generate it. Fresh ordure is innocuous, probably, in its effects upon the animal frame; its decomposition, also, may be arrested or modified by admixture with other refuse matters, such as cinder dust, ashes, sand, &c., or by free exposure to the action of the atmosphere.

Vide Professor Christison's Paper (*Edinburgh Medical Journal*, July 1846), for an "Account of Typhoïd Fever, apparently originating in Local Miasma." The epidemic he describes, was so limited in its sphere of action, and virulent within the circle of its influence, as to have given rise to suspicions of poisoning, although it really depended upon the disturbance of a soil, by digging, which had been impregnated with the products of sewage.

† The hospital sergeant (Royal Artillery) and his family (seven in number) also occupied quarters near this water-closet, and it is remarkable that disease of some kind or other passed through them. Some had attacks of dysenteric diarrhœa, two had a mild form of Typhoïd fever, and the hospital sergeant suffered from febrile dyspepsia.

the fort in question, although composed of the youngest men and last comers of the brigade, suffered in a far less degree than any other battery. The late appearance of the disease among them, and its limited extent, are to be accounted for from their superior sanitary condition and isolated position, remote from city and barrack sewage.

Assuming this to have been a case of contagion, it is the only one I could at all distinctly trace.

Whilst I adopt contagion as a cause of the spread of enteric fever, I do so with limitations, to be expressed, perhaps, by saying that contagion is one, and a subordinate cause, contrasting, in this respect, remarkably with typhus, in which contagion occupies the most prominent, and not a subordinate position.

With all diffidence I must remark that I am not quite convinced by Dr. William Budd's forcible papers that the spontaneous origin of intestinal fever is a myth.

He says that the evidence upon which this hypothesis rests is negative only, and consists solely in our inability to trace with the eye the continuity of a chain whose connecting links are known to be invisible. To conclude from this that no chain exists, is palpably absurd. How absurd, he goes on to say, will appear from the fact that the same evidence would prove the spontaneous generation of plants and animals. Stated in the form of syllogism, the position is this:—Animals and plants are not generated spontaneously, but propagate by the law of continuous succession. It is impossible, nevertheless, in countless instances, to trace their lineage. An impossibility of tracing lineage is, therefore, of no force whatever as an argument against propagation by continuous succession.

Now, is the reduction of the facts to this kind of reasoning so simple and conclusive as he states?

We are in a condition to say that no one has hitherto produced any organism without the agency of pre-existing germs, and, conversely, that wherever such production has been the subject of observation and experiment, the conditions permitting the presence of such germs have never been absent; but it is to beg the point at issue, to say that the generation of Typhoïd fever rests upon the same basis as this, and that the impossibility of tracing the lineage is of no more force against propagation by continuous succession in the one case than the other. The doctrine of the spontaneous origin of intestinal fever does not rest so entirely upon a negative evidence, unless in the sense that would deny the credibility of human testimony altogether. For contagionists to assert that what is not impossible may have taken place, is a secure way of guarding their theory, which would be only justifiable if there were the enormous preponderance of facts upon their side, such as we possess with regard to the transmitted descent of animals and vegetables. The numerous occurrences will remain unexplained, wherein intestinal fever has suddenly appeared in a limited and previously healthy locality, concurrently with a foul state of sewage, &c.—the progress of the disease ceasing with the removal of this, and the most careful enquiries having failed to trace the arrival or presence of an infected person from without—if the occasional spontaneous origin of the disease be not received.*

* The following appears, to my mind, to illustrate this as conclusively as a single fact can:—

In November, 1862, I was asked to see a boy, aged eight, the son of the canteen-man at Fort Monckton. The boy was indubitably suffering from this disease, if a fever extending over fifteen days, marked by rose spots, diarrhœa, tenderness of belly, pulmonary affection, and intestinal hæmorrhage to the extent of one pint during convalescence, be its characteristics.

Now the Fort in question is situated upon a promontory of land close to the sea, separated by a large common from all other buildings. Not a case of fever was then, or had been present in that fort, nor could the occurrence of a fever case be traced in the neighbouring village.

I have the most positive assurances from the parents, that the boy had not been in Gosport for upwards of nine months, and nearly equally positive assertions that he had not been into the neighbouring village for upwards of two or three months. In October the drainage from a latrine in the fort, close to the canteen, had to be repaired.

To sum up the preceding remarks, in the form of propositions, I would say:—

1. That Typhoïd fever is endemic rather than epidemic; when the latter, it is often remarkably circumscribed within one or more limited spheres.

2. That it is, in all probability, contagious; but that this is inadequate to explain all its outbreaks, and that contagion is to be held in the light of a subordinate rather than a primary and principal cause of its spread.

3. That Typhoïd fever is, probably, etiologically allied to other diseases, such as gastro-enteric ones, having either a different or allied pathology.

4. That, in its origin and spread, it has an intimate connection with bad drainage and fœcal fermentation.

5. That the products of such fermentation may be varied in many ways, and that so, in all probability, they may also give rise to diseases differing from Typhoïd fever.

6. That enteric or typhoïd fever is capable of spontaneous origin, as opposed to that of continuous succession from the bodies of individuals under its influence.

7. That it ordinarily commences about autumn, and reaches its acmé of prevalence soon after that season, continuing through the winter in mild climates, but ceasing towards the spring.

8. It is probable that the character and constitution of the season exert some influence. Qy. It has appeared in Malta more than once, after hot and dry summers, with the first autumnal rains.

Age, doubtless, exerts a predisposing influence.

Typhoïd fever is not a disease of advanced life. Only two cases of the disease have occurred in men above the age of 30, in the Royal Artillery and Engineer corps. At the same time, it must be remembered that the majority of sappers and gunners serving in Malta are young men.

Acclimitization appears to exert some influence of a protective nature. The inhabitants of Malta suffered in a far less degree than the troops, and the older residents have been, very rarely, the subjects of enteric fever. The 21st Regiment, which had been stationed here the longest of any line regiment, and at the same time had the advantage of possessing a larger number of old seasoned soldiers than other corps, did not suffer from the fever of 1859. It was a curious fact that only one death from Typhoïd fever occurred in that regiment, and this in the person of a sergeant, living at Floriana, one of the unhealthy localities referred to. Of the Engineers, the last-arrived company alone suffered severely. That company was unfortunately stationed at St. Francis' Barracks, Floriana. The 2nd Battalion 22nd Regiment suffered little compared with the 2nd Battalion 23rd Regiment. The former had the advantage of an excellent barrack, isolated in position, surrounded by the sea, as well as of better air and drainage; while the latter regiment (23rd) was stationed in Lower St. Elmo, one of the worst barracks in a sanitary point of view. Of course the longer-resident regiments or companies are composed, as a rule, of older men, less favourable to become the subjects of this disease than recruits.

Typhoïd Fever, in many instances, is attended with such relatively slight symptoms, that it is more than probable that many cases included under the head "Febris Continua," have, in reality, been cases of enteric fever. Upon the other hand, some cases have been so speedily fatal, as to have been killed apparently by the prostrating effects of the poison, without any effort at reaction in the animal system.

Cases of this latter kind occurred more frequently in the hospitals of other regiments than in that of our own. The aspect and symptoms of these patients were very like those of typhus. There was a heavy, dull, drunken aspect; very tremulous tongue, sometimes furred, with red edges, often it was nearly normal; the conjunctivæ injected, the pupils contracted, venously congested face, unwil-

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and the effluvia from that source was remarked upon at the time by the family, who occupied a casemated room at the back of the canteen. Although it was impossible to prevent other members of the family from sleeping in the room with the affected boy the disease did not spread.

lingness to be disturbed, or speak, and a noisy delirium at night, passing into coma, without any abdominal symptoms; death occurring too early for the appearance of diarrhœa. The tolerance of the symptoms, in many instances, until a late date of the disease, was extraordinary. Patients were frequently admitted into hospital during the third week of the disease, complaining, perhaps, only of a cough. It was not unfrequent to have cases admitted into hospital, suffering from some local disease set up by the poison in the system, only to die within a few days of perforation of the gut and peritonitis.

Some of the cases treated were peculiarly difficult of diagnosis. Thus, in two cases there were such remissions in the febrile symptoms, and such regular diurnal exacerbations, that they appeared to be more like masked quotidian intermittent than anything else. One of the cases had periodical attacks of fever upon alternate days, and I considered his disease to have been a form of tertian ague, until the appearance of a copious rose rash cleared away all doubts.

External Appearances and Aspect. Excluding the above cases, fatal in a very early stage, nothing can be more unlike than the aspects of Typhoïdand Typhus fever patients.

In Typhoïd, the face is almost always flushed; the patient looks feverish, the muscular strength is not greatly impaired; the pupils are generally dilated, and the conjunctiva is clear.

Skin. Appearance of eruption. This has made its appearance about the commencement of the second week. I have not met with it prior to the seventh day while, generally, it has appeared from the seventh to the thirteenth days, eight or nine days being the average.* By marking each spot, upon its appearance, with a circle of nitrate of silver, I was enabled to determine accurately the duration of each papule, viz.—from three to four (very rarely five) days.

The sparsely-shed rose spots, situated upon the trunk of the body, effaceable by pressure, and somewhat raised and papular, are no doubt absolutely diagnostic, when discovered; but the exanthem often appears too late for practical purposes and, in many cases, either does not occur at all, or in so slight an amount, and in such positions, as to escape detection. It was absent altogether in two-fifths of the cases treated. The exanthem never remained after death.

Vesicles sometimes, though excessively rarely, appear upon the summits of the spots. The medical officers were in the habit of testing any doubtful spot, which might be found in a case where the diagnosis was uncertain, by noting its character, duration, and whether it vesicated or not; if it did so, this was deemed, as far as it went of course, as negativing the diagnosis of Typhoïd fever. Two exceptional cases occurring within my own observation led me, however, to modify that opinion.

The Typhus Rash appears to be an external and visible mark of that general pathological state of the sanguiferous system, by which there results a stasis of blood in the capillaries, ending in an effusion or transudation of some part of that fluid into the tissues. A bloodiness of tissue, localised injections of vessels, small ecchymotic or petechial spots, are found in the organs of the body generally. The rash of typhus goes through a series of changes from the fact, that at first there are very minute dots of capillary injection, which, afterwards coalescing, form larger blotches; the subsequent appearances being such as result from changes in these blood stases or effusions.

Carrying in remembrance these facts, we can generally, if not always, discriminate between the two rashes. The greater number, by far, of the spots in every Typhoïd fever case will run a rose-papular course of three or four days' duration; petechial spots may appear independently, or some papules may run on to petechiæ and so attain the last phase of the typhus rash without, however, having commenced as dots, or pursued the gradual and continuous course of the latter eruption. Such spots ought to be regarded rather in the light of a purpuric than a petechial rash.

I have seen four or five cases of the following:—The subjects were young.

* Making allowance for undiscovered spots, I still think that the exanthem occasionally does not appear until later dates—fifteenth to twentieth day.

of delicate and fair skins, in whom the tegumentary circulation was active. One would expect, consequently, a florid eruption; and so it has happened with the first or second crop of spots. As the cases approached, however, the more advanced stages of the disorder, perhaps, a sudden and active stage of diarrhœa, with great impediment to the pulmonary function would occur, together with sharp though transient pyrexia, and followed by great asthœnia. The eruption, which appeared coincident with these symptoms, has been very copious, covering the face, trunk, and extremities; at first of pink colour, then brick-red. Mingled with these spots were numerous small purpuric or petechial ones, which failed to disappear upon pressure. With one exception, these petechial stains were independent of the typhoïd rose spots. Œdema, purpuric blotches, and vibices, about the lower extremities, were not uncommon. The copious rose rash was probably due to the relatively more active physiological action of the skin. The purpuric spots were the result of an osmosis of hematine, either from the arrested blood in the capillaries, or from a lesion of the coats of those vessels; the stagnation of blood being a measure of the extremely-impeded pulmonary function, impaired contractility of the skin, and asthenic condition of the patient.

Putting aside the rare cases, in which there is a hybrid disorder from a co-existence of the two fevers, I believe that these are the cases which mimic the typhus eruption, and have been recorded as such.

Allowance being made for the more speedy fatality of the disease at the commencement of the epidemic, it yet seemed to me that the appearance of an eruption was less common during the summer than in October and November. Its presence seemed to import little, if anything, for it occurred in the mild as frequently as in the severe forms of the disorder. The cases attended with a copious rash were not at all more severe than others.

Pulse and Circulatory System.—The pulse during the progress of the disease exhibited the most curious and unequal changes:—1st. Almost every case had a diurnal exacerbation of fever—this phase commencing in the afternoon, increasing towards night, when sweating, delirium, and all the symptoms were most aggravated. 2ndly. Variations from day to day: one day the pulse would be over 100, the next 80 or 90, and so on, from day to day, the preceding day being no index to the succeeding one, unless in a few cases of intermittent type, when it might be said that two days stood in some inverse relation one to another, viz.,—if on Monday the pulse were 120, on Wednesday it would be also very frequent, but on Tuesday it would be 100, or below it.

The majority of cases will present such irregularity, however, as to prevent analysis and comparison.

As in other fevers, so in this, headache (frontal generally in seat, and varying very much in degree) was present at the first, and, as this passed off, delirium, if it appeared at all, supervened. The two did not coexist, nor did delirium commence as the earliest symptom. It was true, however, that in a few rare and speedily fatal cases, delirium was a very rarely-observed symptom; but, if an accurate history of the disease were obtained, it would be found that the stage of headache corresponded to a period of inobservation, prior to admission into hospital.* I have seen noisy delirium appear after restless nights, pass into coma, and the subsequent *post-mortem* prove, that not the slightest trace of ulceration was present in the enlarged glands. These were bad cases, in which the amount of urine passed was so small as to warrant a supicion of its suppression.

Sleeplessness, nightmare, and vague sense of headache were the symptoms complained of by the patients during the earlier stages, in cases running an ordinary course.

The Digestive System.—"The small, red-fissured, pointed, dry tongue," remarked by Jenner as almost diagnostic of this form of fever, was often absent and certainly, in the majority of cases, did not present itself until a late period of the disease. During convalescence, however, and for a long period after recovery from the fever, the tongue remained red at the tip, and pointed. The appearance differed, of course, in different cases; but the rule was a large

* Delirium, combined with a fixed pain in the head, is suggestive, to my mind, of some intra-cranial inflammation.

tongue, broad at the apex, with a whitish-yellow fur along the dorsum, vascular and reddened peripherally. Sometimes it was without any fur and, save that the organ was a trifle redder than common, it preserved the appearance of health for some period. Often,—during the first week particularly,—the tip of the tongue presented a few elevated and reddened papillæ, such as are observed in great smokers. The red, clean, glazed-looking tongue, devoid of epithelium along the centre, with an inflamed looking periphery, was almost pathognomonic of the disease. The periodical cleaning and furring of the tongue was very common; a vegetable fungus was often present (*oïdium albicans*). The palate and pharynx were found frequently affected with an erythematous redness, and minute epithelial ulcers. The tonsils and palatine arches were sometimes florid and injected: hence sore throat, painful deglutition, and a dislike to hot fluids, often existed. I heard that a similar condition of the mucous membrane of the nasal cavities existed in one case, and that ulcerations were found in the nares after death; no syphilitic taint being present. When this condition of the throat appears in a child, with the tongue bearing prominent and red papillæ in a white fur (strawberry tongue), and is accompanied by a copious rose rash, the case may be mistaken for one of scarlatina, to which it bears some resemblance.*

There is a state of the tongue—large, red edges and tip, white creamy centre, and very tremulous—which is often termed the "Drunkard's tongue." This condition so resembles that seen in typhoïd fever, as to preclude often the possibility of deciding to which it belongs; and when the case is really a mixture of both diseases (not uncommon among soldiers), this difficulty is still further increased.

Case.—Sergeant J.C., Royal Artillery, admitted December 1858, complaining of dyspeptic symptoms, anorexia, headache, and pain in his limbs; the tongue was very tremulous, furred, with a broad, red apex; his manner was very excited, he trembled greatly, said he had not been able to sleep well for there or four nights; there was trifling pyrexia; he denied having drunk hard. The hospital sergeant afterwards stated, that Sergeant C. had confessed to him that he had been drinking hard. This patient had no diarrhœa, nor abdominal tenderness; his tongue became quite clean after the administration of an emetic, but his pulse was 116, and he was delirious and sleepless at night. An opiate procured him sleep, and he appeared much better. On the fourth day he passed a stool in bed; there was wincing on deep pressure of the right iliac region, and slight meteorismus—no spots. The disease was evidently enteric fever, of which he died, from peritonitis, the result of perforation of the bowels, having previously lost a large amount of blood by stool. An autopsy revealed an extensive ulceration of Peyer's patches.

Jaundice† (slight in two) was present in three cases. Bile pigment was found in the urine in four cases. In every case of Typhoïd fever—during an early stage more particularly—there is an increased volume of the spleen and liver. The results of percussion, and the evidence of post-mortems obtained at an early stage of the disease, are alike corroborative of this. Such splenic enlargement (variable in degree) is common to all febrile abdominal disorders, that organ being, in reality, a very delicate test of the action of malarious and miasmatic poison upon the system.

Vomiting was an occasional, but transitory symptom in many cases. In three cases—proving fatal within the first week—vomiting was, however, one of the most urgent symptoms. In one case (the wife of an officer) the patient vomited almost everything she took. Diffused through the vomited fluids

* It is probable that, in some few cases, a diffused redness or erythema of the skin may appear at the onset of the disorder, for a medical officer, whose observation and experience were perfectly trustworthy, declared that he had seen a scarlatina rash as the precursor of the typhoïd eruption. His patient was a child, and there was no scarlatina present at the station at the time.

† In one fatal case, the icterus was very marked, and it is interesting to note that, from the remittent type of the symptoms during life, the disease was supposed to be a form of "bilious remittent." Jaundice must be very rare, as Jenner has never observed it in Typhoïd fever. Qy., What the modifying effects of warm climate?

there were numerous reddish filamentary looking fragments, which microscopically appeared to be small coagula of fibrine and blood globules. I presume that these were portions of extravasated blood, from some epithelial ulcerations and abrasions about the pharynx. In this case there were curious nervous phenomena— viz., clonic spasms of the upper extremities, with dreamy delirium.

Gurgling on pressure of the belly is a symptom common to many disorders, and is but little reliable as a symptom of enteric fever, unless it be persistent.

Abdominal Tenderness.—One-third at least of the total number of cases treated had no tenderness whatever. Sometimes an intelligent patient would wince on deep pressure in the iliac regions, but would urge that a similar amount of pressure would give anyone uneasiness. *Tolerance of pressure was out of all proportion to the amount of anatomical lesion present in most of the fatal cases.*

Diarrhœa was present, at one or other period of the disease, in three-fifths of the cases; but, prior to the later stages, it was either absent altogether, or was not by any means an urgent symptom. In one-fifth of the cases treated, not only was there no diarrhœa present at any time, but an opposite condition existed, requiring the use of mild aperients and enemata; the smallest doses of castor-oil served to act, however, where constipation was a symptom.

The Stools. These, in the few cases I tested, were alkaline in their reaction. One of the most diagnostic marks of typhoïd fever is the colour of the stools. These have been invariably found lighter than in health, yellowish and bilious, pea-soup-looking if loose, and ochre-coloured if the reverse. It must be remembered that milk diet always produces yellow stools. During the first two or three days the stools may appear natural, but that they assume a lighter aspect long prior to any ulceration, I have no doubt. During the ulcerative stage they may be dark and melænic, from the presence of blood, the hæmatin of which has been acted upon by the intestinal gases.

Hemorrhage from the bowels has occurred five times in my own practice here, and four of the cases died. Great differences of opinion seem to exist as to the importance of this symptom. Inasmuch as it may arise from different sources and causes, so must the gravity of its import vary. As it exudes from an abraded fungous granulating substance — from arterial or venous implication in the ulcerating or sloughing process—so will the occurrence of hemorrhage vary in amount and danger.

Intestinal hemorrhages, from insidious ulceration, are not uncommon during apparent convalescence, and serve to indicate the great care required in diet during such times.

Shape of the Abdomen. In perfect contrast to the shrunken concave condition, so frequent in Typhus, the abdomen in Typhoïd fever is always at least as full as in health and, in hardly any case, has it retained its natural contour and aspect throughout the course of the disease. More or less tympanitis was almost invariably present, and the belly, as Dr. Jenner states, had a tub-shaped aspect. That peculiarly dry, harsh, "branny" condition of the skin over the abdomen, present at an advanced stage of the disease, continues during, and long after apparent convalescence.

Pulmonary System. Bronchitis, or a peculiar form of pneumonia was present in every case examined after death, or their symptoms were observed, at some period of the disease, during the life time of the patient. In the more severe and prolonged forms of the fever, this complication commenced about the beginning of the third week, and about the middle period of the second week in the milder varieties. In four cases, the patients sought hospital treatment for "cough." My own observation would lead me to augur favourably of a case in which the pulmonary symptons were of early occurrence, as indicating a less protracted form of disease. It follows that, in a doubtful fever case advanced to the twelfth or the seventeenth day, the detection of sibilant or crepitating râles is strongly corroborative of the disease being Typhoïd fever. It has been termed a peculiar form of pneumonia, because the pneumonic state rarely passed into well marked consolidation. It appeared to differ from the idiopathic variety, in wanting a well defined coagulable exudate. Rusty sputa was never observed during life; the dulness over the portions of lung implicated was never absolute or wooden, and the crepitation, to my ear, partook more of a sub-crepitant than a minute crepitant râle.

Epistaxis. This was present in nearly half Louis' cases, and in one-third of Jenner's available fatal cases. During the present epidemic it occurred in only four of the cases which I witnessed. I may remark that, in one of them, the loss of blood appeared to be critical and markedly beneficial, the patient improving rapidly from that time, and of the remaining three not one died.*

Pleuritis. Symptoms of pleurisy were uncommon. I can only find mention of five, in which it was diagnosed during life, and in twenty-five post-mortems in which I noted this fact, recent pleuritis was only found six times, (40 per cent. of Jenner's fatal cases.)

Cardiac Disease. Pericarditis was found once among the post-mortems of this fever in 1859, and I saw two in 1856, making three cases in which pericarditis was the apparent product of Typhoïd fever, besides two cases in which the kidneys were diseased.

Renal Functions. The urine was of high colour: averaging 20 to 25 oz. in the twenty-four hours, having a specific gravity ranging from 1022 to 1030, acid, non-albuminious (save in one case, or where some prior renal disease existed),† and, occasionally, depositing urates and uric acid. During the period of rapid accession and development of the symptoms (first week), there was a marked diminution in the amount of water excreted. The worst cases, of an adynamic type—cases apparently labouring under the directly prostrating effects of the disordered blood upon the nerve centres—excreted urine remarkable for the dimished amount of water and solids. In one case, which was complicated with icterus, the patient excreted only 7 oz. of urine (specific gravity 1030) in forty-eight hours, and this was albuminous, and loaded with bile pigment. He died apparently of coma, the result of uræmia. In *no* case of Typhoïd fever, was I able to detect uriniferous casts in the excretion, except in that just mentioned. As far as my very limited observations went, they were directly parallel with the extended analyses since published by Drs. Parkes and Warnecke. In no case of pulmonary disease was there an entire absence of chlorides. Patients (during the later stages particularly) complained of urethral scalding and difficulty in voiding their urine; but retention of the urine, from functional paralysis of the bladder, did not arise among the patients treated by me, although this was one of the earliest symptoms in a rapidly fatal case occurring in the 4th Battalion Rifles.

Local Dropsy. Dr. Fogo, late of the 23rd Royal Welch Fusiliers, shewed me two or three cases of dropsy of the right lower extremity, occurring after enteric fever. I have observed the same thing five times before, in prior epidemics. It depends, it is to be presumed, either upon the entrance of something from the intestinal ulcers into the veins, giving rise to embolism, or upon a spontaneous coagulation of the blood within the venous system.

Recurrence of the Fever with Spots. I have notes of four cases, (treated in the Royal Artillery Hospital), in which the febrile and enteric symptoms recurred, with a reappearance of the rose papules, during the stage of convalescence.

Duration and Varieties in Point of Fatality.—The cases, that were at all severe, rarely improved under three weeks or thirty days. There is great difficulty in arriving at an accurate date as to the termination of the fever. The result of clinical and post-mortem observation would lead me to infer, that the typhous material commences to soften about the end of the second week, and that the ulceration and elimination of this deposit proceeds energetically, and, as it were, critically during the third week. In moderately severe cases by about the thirtieth day, the typhous material is eliminated; but the ulcers remain soft, denuded, and in various states as to vascularity for a much longer period. If the ulcerating process set up in the intestine continue, as it often does unfortunately, this is, of itself, sufficient to cause the phenomena of the fever and, in this way, a case may be prolonged until the sixth week or more, and terminate ultimately by perforation of the bowel. In one such, that died during the sixth week of peritonitis from perforation of the ileum, no trace of

* This was opposed to my prior experience.

† If the urine be tested with nitric acid for albumen, a precipitate will often ensue—uric acid and nitrate of urea; this cannot mislead, if other tests be applied for albumen.

typhous deposit was found in the seat of the ulcers themselves; but some of the mesenteric glands were as large as a hen's egg, and could be detected through the abdominal parietes during life. In this case there was a recurrence of the eruption during apparent convalescence.

It often happened that a patient reached a stage in which the pulmonary symptoms were severe, the diarrhœa excessive, and the nervous prostration so great, that it was doubtful whether he would be alive in twenty-four hours; yet nothing was more common than to find the patient, the succeeding day, wonderfully better and, from that period, to progress steadily towards recovery. This appeared to be a stage of tumultuous ulceration and elimination of the typhous deposit, through which, in a greater or less degree, every case passes.

What is the cause of the fluctuations in the patient's pyrexial condition from day to day? The varying states of different solitary and agminate glands, as regards active local processes going on in one or more of them; such as an active local softening or ulceration! This was the explanation I had formed in my mind, and had heard given; but it can hardly be the whole truth, for such varying conditions of the patient from day to day have been seen in a few cases, which proved fatal before any softening or ulceration had taken place.

Although there were fluctuations in point of fatality and severity, these characters seemed to have more reference to the locality from which the cases were admitted, than the period of their occurrence. Those occurring during the first period of the epidemic were, however, more severe and rapidly fatal than those furnished in December, when the disease began to be much milder and more amenable to treatment.

The diagnosis of Typhoïd fever presents no great difficulty if the case can be observed for some days together. The exanthem absent, however, I know of no means by which we can decide as to the nature of the disease, if the period of observation be limited.

Two diseases are extremely difficult of diagnosis from Typhoïd—1st, Acute Tuberculosis; 2nd, certain cases of Pyæmia.

In the latter the distinction can generally be drawn, but it is not so in the former, unless the specific exanthem appears. The term specific exanthem is used, because I fancy that I have seen spots appear, something like, but still *not* identical with the typhoid rash, in two cases of acute tuberculosis, wherein the symptoms resembled those of enteric fever.*

Pathology and Morbid Anatomy.—Without entering into any detailed account of the various organs, I shall simply refer to the post-mortem appearances in general terms, and enumerate any unusual lesions that may have been discovered. Many opportunities for examining the bodies of persons dying at early stages have occurred. The pathological states of the intestinal and mesenteric glands arrange themselves into two groups:—

I. A deposit of typhous material in the glands, variable, but large in amount, with great local congestion or active inflammation of the mucous membrane in their neighbourhood.

II. A minor amount of deposit and swelling of the glands with, relatively, little or no inflammatory action.

I would also remark upon III. The occurrence of enlargement of the mesenteric glands at the earliest stages and, in some cases, out of all proportion to the amount of disease in the intestines.

Rokitansky's description of the morbid appearances is both accurate and minute. The deposit in the intestinal glands is both a product of, and an index to the toxœmic condition of the blood. To the metamorphosis taking place in this deposit—comprehending its softening, ulceration and elimination must we look for the cause of the abdominal symptoms of the Typhoïd patient. No one can have made many autopsies without having noticed the marked differences, in point of vascularity of the ileum, existing in different cases. In many, this bowel was so much inflamed that it looked as if it had been exposed to the action of an irritant poison; the veins in the neighbourhood and on the exterior of the bowel, were full of stagnant blood, while

* In two cases of acute phthisis with abdominal symptoms, occurring under my observation in the Mediterranean, I noticed a few pink spots on the belly. These vesicated at their summits on the second day and lost their colour.

within, the mucous membrane was of a crimson aspect and softened, and the submucous tissue was infiltrated with serum - indeed, blood itself had often escaped into and beneath the lining membrane. In other cases, dying at the same period, there was little or none of this inflammatory redness and congestion, even where the enlargement of the glands was very marked. There were numerous degrees, of course, between the two extremes, but the majority of cases approached in character to the first variety. The intimate connection of the symptoms and febrile phenomena with these local congestions and inflammatory states explains how much the treatment of this fever differs from that of typhus, and how widely one case may differ from another according to the stage and state of the intestinal disease, as regards vascular reaction. Not a case died of fever here (that I am aware) after having presented the symptoms of enteric fever, without the usual morbid changes having been found in the intestines, although many have died in whom the true disease was not accurately determined beforehand.

It has been said, that the mesenteric glands enlarge subsequently to the disease of the Peyerian patches, and one authority (Jones and Sieveking), compares the process to that of a syphilitic ulcer and bubo—the latter proceeding either from the irritation or some morbid condition induced by the former. This view does not seem to be supported by post-mortem evidence. There is no stage at which a patient may die in which enlargement of the mesenteric glands will not coexist with the affection of the intestinal glands. In some cases the enlargement of the glands (mesenteric) was out of all proportion to the extent or duration of the disease in the intestine. No doubt the morbid process in the mesenteric glands advances with the progress of the case; but they are nevertheless affected at a very early date, and long before softening or ulceration of the intestinal product occurs. The intestines and mesentery were examined in the case of a patient, who died forty-eight hours after admission into his regimental hospital, apparently killed by the effect of the fever poison upon his brain, for he died comatose. The glands of the bowel were studded with a dull opaque deposit; neither softening nor ulceration existed anywhere, yet the mesenteric glands were very large, indeed, as large as I have seen in any case, except one. When it is considered, that, anatomically, the mesenteric and peyerian glands are part and parcel of the same system and structure, composed of the same anatomical elements, and drawing their nutrition from the same vessels, while physiologically, they appear to be subservient to the same purposes, it seems probable, upon *a priori* grounds, that the mesenteric disease is coincident with the enteric. From about the tenth or twelfth day of the disease is the best period for observing the degree and amount of the deposit. If the patient die during, or at the commencement of the ulcerative stage, such deposit will be found projecting from the bases of the glands towards the interior of the bowel, resembling very closely in appearance the degenerated plasma at the bottom of a common boil. As it becomes exposed to the interior of the bowel, from the loss of the mucous membrane, it imbibes the colouring matter of the bile and becomes yellowish, resembling the flaky yellow matter seen in the stools during life—and it is this, in part, in all probability. The deposit cannot be artificially detached from the submucous tissue, for it tears through its own substance in the attempt. It admits of ocular demonstration that this typhous material is situated beneath the mucous membrane, for the latter may be removed, leaving the former and, by a perpendicular section, it is easy to trace its relations to the mucous and muscular coats of the bowel. I have cut through portions of such typhous deposit a quarter of an inch thick. It never reaches the muscular coat and, when perforation occurs, it does so by virtue of a continuation of the ulcerative process commenced in the deposit in the mucous and submucous tissues.*

Not being well acquainted with the normal microscopic structure of the mesenteric glands I was unable to decide which was the result of typhous deposit, and which was the proper structure of the gland itself, for they appeared

* The term exudate has been used to indicate that deposit which causes the tumefaction. It matters very little really, whether the material is a product from the vessels, effused into the part, as the Austrian school teaches, or whether it is actually produced by the cell elements of the tissue, as Virchow holds.

to resemble each other closely. I have only once seen actual suppuration of the mesenteric glands, and that in a case protracted by relapse. The glands were occasionally found softened in their centres, in those dying during the ulcerative stage, but the process could hardly be called suppuration.

We can thus roughly divide the pathological appearances into two groups, and for practical purposes this seems to me to be very useful. If, however, we have regard specially to the disease of the peyerian glandulæ, we find the cases admit of a more refined and accurate grouping.

When the deposit is very large it can be seen to slough away. When less in amount, but still large, portions of the new and germinating formation, remotely placed for vascular supply, will die in small pieces; while another portion will undergo a still finer and molecular necrosis, and the remainder, degenerating, may be absorbed or pass off with the discharge from the ulcer. So we pass to a condition in which there is a minimum amount of this morbid deposit. Judging from microscopical examination of this, it would appear to undergo a process, which Virchow terms "tuberculization," becoming a fatty, granular, and pigmental mass, and, as such, is absorbed either without any, or a very trifling loss of substance in the mucous membrane.

It is to the admixture of certain products with the blood, from degenerating and ulcerating typhous material, that many of the inconstant and irregular pyrexial states and local complications, occurring at a late stage of the disorder, may be due.

This absorption and atrophy of the gland structures may proceed to such an extent as to materially interfere with the nutrition of the body.

A question arises here:—If a deposit into the peyerian and solitary glands, be an invariable accompaniment of enteric fever, must such deposit be eliminated by processes of ulceration or sloughing, or is it capable of absorption?

Morbid anatomy fails to supply an exact answer to these queries, because as the milder cases are not fatal we can obtain no post-mortem evidence. That the amount of deposit is very variable, and that, in many cases, it must be very slight, the symptoms and short course of the fever in these cases sufficiently attest. The quantity of typhoïd deposit in three cases which I examined was very minute, amounting to the merest tumefaction of the follicles. Upon the other hand, the enormous amount of the deposit and the size of the sloughs, in some of the fatal cases, were such, that one is compelled to think that the ordinary cases of enteric fever could not have been accompanied by such lesions. The mildness of the general symptoms, and shortness of the course in certain cases, conjoined with the entire absence of diarrhœa, render it highly probable that the disorder is often aborted, the amount of deposit being trifling and removed by absorption. The fact that the tumefaction and deposit in the mesenteric glands must be so removed is an evidence that there is no valid reason against a similar process occurring in the intestinal glandulæ.

Peritoneum. Of seven instances of peritonitis from perforation, in which I noted the facts, I find:—

In four there were pin-hole perforations through the ulcers; in two they were from sloughing of the bases of the ulcers, extending to the exterior; and one was a perforation of the bowel from without, an abscess of an attacked mesenteric gland having communicated with an ulcer in the intestine.

I have never witnessed perforation in the form of a "crack" or "fissure" of the serous membrane. In all the above cases the seat of perforation was within six inches of the cœcum.

The Spleen. This differed much, according to the date of the patient's death, from the commencement of the attack. During the first week it was much increased in volume, and of a dark chocolate-claret hue. The size and consistence of the organ must vary according to the relative proportion of the fluid to the solid contents. Its structure was not notably altered in consistence during the very early stage, but, if anything, it was upon the side of softness. During the mid-period and ulceration stage, in addition to an increase of volume, the structure was softer, looser, more friable; indeed it often broke down under the finger, like black currant jelly. After this period, if the patient died of consecutive debility and anœmia, the spleen was found contracted and corresponding to the atrophied and bloodless state of the viscera and tissues generally. Rokitansky and others go so far as to state, that the

condition of the spleen is one of the best and, sometimes, the only index we have to the presence of a blood poison, so constantly are alterations discovered in it after death from febrile disorders. Its condition, as regards softness, will be found to correspond very nearly to the condition of the mesenteric glands themselves, I apprehend, in Typhoïd fever.

Pleura. Marks of recent pleuritis I have noted six times, in twenty-five post-mortems.

Bronchi and Lungs. A diseased state of the bronchial mucous membrane was always found; almost as frequent is this as disease of the Peyerian patches. Even at the earliest dates the state of the bronchial tree was rarely quite normal; the lining membrane of the larger tubes had a dull reddish aspect, approaching in shade to a violet tint, while, at a later period, mucus and fluids in the tubes, with injection, thickening and softening of the membrane were invariably present. The lungs—never perfectly healthy—were heavier in parts than normal, floated deeper in water, and blood and serum followed the tract of the knife. The pneumonic lung,—with its cells filled with granulations, solid and friable,—I have not witnessed frequently here, as a product of the Typhoïd disease *per se*. The surface of the lung is peculiarly mottled and discoloured in aspect, and the substance is marked by numerous irregularities in point of consistence, when compressed between the fingers. Sections of the organ afford the same appearances—suggestive of different degrees of affection of the same process. Instead of one uniform progress throughout an entire lobe, there are separate patches of diseased lobules, as if the affection had proceeded from various distinct points. If the twigs of pulmonary vessels leading to these diseased lobules be laid open, coagula will be found in their interior.

Pericardium.—In one fatal case occurring in another regiment, there was an effusion of lymph over the whole pericardium. Of 2 fatal cases, examined in 1856, one had 8 ozs. of serum with a small amount of lymph in the sac, and another had purulent effusion with degenerated lymph in the same part.

Air in the Venous System.—In 1855, I witnessed 2 post-mortems in which air or gas was universally present in the venous system. In one of these cases, which I saw just prior to death, there were some extraordinary symptoms, and an emphysematous state of the upper half of the trunk was present. The second case had been using a bed-pan, when he suddenly began to gasp, became very pale and cold, and died in a few minutes. The third was observed in 1859. This patient died, very suddenly, after hæmorrhage from the bowels.

The gas was decidedly not the product of post-mortem decomposition in the above cases. There were certain conditions common to all these cases; viz., the blood was dark and fluid throughout the body, and bubbled out from the divided veins. In the first two cases, there was an emphysematous state of the tissues of the neck and chest, besides air in the right side of heart, hepatic and portal systems, venæ cavæ, &c. The lungs were emphysematous, but no air was expelled by inflating them. In the third case, the air was only present in the abdominal veins (portal system). In this instance, the patient had lost a large amount of blood by stool and, although the lesion of the vein was not discovered, it is probable that it may have entered a vessel, through an ulcer in the bowel.

It appears that, occasionally, emphysema is produced by the entrance of air through an ulcer in the larynx; but no ulcers of this part were found in the above cases.*

This condition of the venous system is, apparently, not infrequently found after death, in cases where fatty degeneration of the tissues is present, according to Dr. Stokes. Dr. G. O. Cless, who has published a Memoir upon this subject, relates similar cases, (all of typhoïd fever), and he inclines to the opinion that the air is generated during life, by some spontaneous decomposition going on in the elementary constituents of the blood itself.

Softening of the *Cardiac Muscle* was of most uncommon occurrence; the

* I have no doubt, however, that the phenomena may be so caused, because I remember seeing a case in Gibraltar produced, apparently, in this way; and at the same station, emphysema of the upper half of body occurred in a case of fracture of thyroid cartilage, and laceration of the laryngeal mucous membrane.

ventricles were generally contracted, and the muscular walls ruddy, or of a mahogany hue, without any appearance of softening.

Of the many post-mortems of this disease which I have witnessed and made in this climate and elsewhere, I have met with only one instance in which tubercle existed in the lungs.

In one case, observed in 1856, the mucous membrane of the bladder was found to be completely detached, and lying in the interior of the organ. The late Professor McGregor published accounts of similar cases; but in his, I believe, the patients had suffered from typhus, and not enteric fever.

Of those cases in which there was a recurrence of eruption, (of which I have now seen many), I may mention 3, on account of the fatal result admitting of their post-mortem examination. In 2 there was a re-appearance of eruption (copious in amount) at a late date of the disease, when the patient's appearance and symptoms indicated convalescence. Concurrently with this there were signs of febrile excitement—sweating, bronchitis, &c. In the first case, there were found numerous cicatrices in the ileum and two vascular, discharging ulcers, seated near the ileo-cœcal valve. The ulceration was not extensive, a small amount of still uneliminated and softening deposit appearing at the base. In the second case a similar condition existed, but the disease was rather greater in extent, and there was more local vascularity around, although it was evident that recovery had become very nearly established. The third patient had passed through the successive stages of Typhoïd fever, had been nearly nine weeks in hospital, and was apparently convalescent, when a sudden accession of fever supervened, with asthenic bronchitis, and a copious effusion of rose papules appeared upon the belly, mixed with sudamina. Diarrhœa and tenderness were present, the latter so sudden and so rapidly increasing, as to give rise to the idea that peritonitis, from perforation, had ensued. Death took place in a few days, preceded by rapidly developed asthenia. Examination proved that there was a slight amount of peritonitis, localised to the cœcum and a few of the adjacent coils of small intestine. Four inches from the cœcal valve was a large oval depression in the mucous membrane, perfectly free from inflammation or deposit. The base of this old ulcer was smooth, and its edges bevelled. In the centre was a very minute depression, which communicated externally with an attached mesenteric gland. The gland was much enlarged and suppurating in its interior, so that pressure caused the contents of the gland to ooze into the intestine. From the appearance of the perforation, as seen from without—the larger destruction of the peritoneal and muscular coats, and the minute internal opening, forming a cone-shaped ulcer—I have no doubt whatever, that the perforation had taken its course from without, and that the little abscess of this attached mesenteric gland had so discharged itself.

This reproduction of spots, bronchitis, sweating, &c., were they not the result of blood infected by the products of the local disease? I have been in the habit of regarding many of the secondary morbid processes, (whether occurring at a late stage, or as complications and sequelæ of the disease), as arising from this source. It is not uncommon for a copious eruption and pyrexial excitement to precede and accompany a diarrhœa, which is to usher in and terminate the last phase of the abdominal disease.

The very prolonged convalescence and the grave impairment of the nutrition and development of the body, from which some patients continue to labour after recovery—which is, after all, in some cases, only recovery as regards the special fever and its immediate products, and not an absolute return to health—can only be the result of a great destruction of those glands, whose position and function are mediate between chyme on the one hand, and elaborated blood upon the other. These glands are absent after the age of 50, as physiological organs, and their size, prominence, and physiological activity coincide with the period of greatest activity of the organic processes of the body.

After a severe attack of enteric fever, the patient is peculiarly liable to suffer from an atonic form of dyspepsia and symptoms almost identical with the so-called strumous dyspepsia, which may be the prelude to tubercular disease, of which I have at present a well-marked instance.

In a case of typhoïd fever, in the person of a little girl, this cachectic state, as a sequela of the fever, was present. At a date, long after the supposed recovery from fever, the child remained very ill; had a waxy, bloodless aspect, and

steadily emaciated. Afterwards, the child had delirium, and, about one week before death, she kept constantly picking the nose. The hands were placed in gloves. She then began to roll the occiput upon the pillow until all the hair was rubbed off. Death was preceded by coma. I was led to diagnose tuberculous meningitis, from my inability to find any cause for the continuance of these symptoms, and from the peculiarity of the cerebral disturbance. Such, however, was not the case. A post-mortem examination revealed a very bloodless brain, with a good deal of intra-cranial serosity, but neither lymph nor tubercle was present. The coats of the small intestines and stomach were as thin and pale as paper. Cicatrices were observed, scattered over the mucous membrane and, with the exception of two or three slightly congested ulcers in process of cicatrization, no traces of the typhoïd disease were discovered. The prominent appearance of the glands in the intestines of children is well known; but, in this case, their paucity and insignificance were remarkable. The symptoms and fatal result can only be explained by an anœmic state of the blood, and an impaired nutrition of the tissues, allied to leukœmia, from the loss of those glands which we know to be in full physiological play in childhood.

Simple Continued, Ephemeral, Febricula, or Maltese Fever.

The latter is the term by which a short and non-dangerous fever of a continued form is characterised alike by the medical men and their patients.

It lasts, generally, from 3 to 5 days, and more rarely 7 days. During the years 1855-6, when a large body of young troops were temporarily stationed here, *en passant* for the Crimea, I had the opportunity of observing and treating, perhaps 100 cases, as well as of comparing observations with an army surgeon, long resident here.

The disease seems to arise from exposure to the sun's rays or to some alterations of temperature, upon the part of one who is the subject of constipation and portal congestion. Those who have suffered from ague elsewhere, are more particularly prone to attacks of this disease. New comers, (particularly persons under 25), are liable to suffer from it. It is incidental to the spring, summer, and commencing autumnal periods of the year. After an exposure to the sun, or to some fatigue, the patient complains of shivering, sense of weariness, headache, muscular pains, anorexia, and thirst. This is rapidly followed by pyrexia, a pungently hot skin, a frequent, sharp pulse, (the frequency bearing no proportion to the danger, for it is never fatal), constipation, arrested secretions, and pain in the eyeballs, which are tender to pressure also. Occasionally, though very rarely, there is delirium at night. It is a curious fact, that the last symptom (delirium) I have never observed among the men; it has been only among officers attacked that it has appeared, and then but rarely. This depends, probably, upon some psychological reasons. The disease, generally, terminates by a critical discharge, and, if mild, in about 72 hours. As in almost all diseases here, there is a tendency to a remission of the fever during the day, and to an exacerbation at night. The excretions, during the period of attack, are diminished; bowels confined; skin hot and dry (ranging from 99° to 104° F.), and the amount of water in the urine is much below that of health. Coincident with recovery, some critical evacuation, apparently, occurs; the quantity of solids and water in the urine, passed in twenty-four hours, is much increased: in some cases, these double the amount passed upon the preceding day; or an equivalent excretion occurs—as profuse perspiration, diarrhœa, or epistaxis.

From notes of 3 cases, in which the temperature of the skin was taken thrice daily, and where the duration of attack averaged 72 hours, I find—That the temperature ranged from 99° F. to 104° F., the former number representing the morning period, the latter the evening, of each day. The temperature commenced to sink about 60 hours from the commencement of the attack, in 2 cases. During the succeeding 12 hours, however, it fell to 90° F. The excretions had but slightly, if at all, augmented during this de adence of temperature, and it was not until after the normal temperature of the skin was restored, that the rapid increase of the excreta appeared. I purposely omit the rough analyses made of the urine, because these were too few in number and too deficient of scientific accuracy to justify any conclusions.

The patients remained debilitated and anæmic-looking, out of proportion, often, to the duration or severity of the disease. Relapses were not very frequent, (about 15 per cent.); such relapses occurring at indefinite periods after the first attack.

The pathology of this fever, studied in connection with the theories advanced by Virchow and Parkes upon pyrexia, is highly interesting, as illustrating their views.

The term "aguish" appears to express the character of this disease better than any other, although I can offer no definite reasons to support such a view. It runs its course, spite of the administration of quinine.*

This disease has an intimate relation to the other fevers and dysentery, for it occurs among the same men, under the same influences, and at the same periods and, like them, it is occasionally followed by rheumatism. It is best treated by a mercurial or saline purgative, followed by quinine.

Of late years, it has seemed to me, that the prevalence of this three-day fever has considerably diminished, while other febrile diseases, of a severer character and longer duration, have made their appearance. Fever of longer duration (five to seven days) is also more common than it was.

The civil surgeons practising here consider that a very marked change has taken place in the type of fevers generally. They are in the habit of referring the date of such alteration to the period of the Crimean war. However this may be, typhoïd and fevers of long duration appear to be more common than they were six or eight years ago.

Mediterranean Remittent. Gastric Remittent Fever.†

By this is meant a fever characterized by the following symptoms and course:—A preliminary stage of subacute dyspepsia, anorexia, nausea, headache, feeling of weakness, lassitude, and inaptitude for exertion, mental or physical, chills, muscular pains; lastly, a fever, having a very long course—three to five, or ten weeks—marked by irregular exacerbations and remissions, great derangement of the assimilative organs, tenderness in epigastric region, splenic enlargement, slight jaundice, without any exanthem. Neither bronchitis nor diarrhœa, as a rule. The patient is prone to relapses, and the disorder is followed by a protracted convalescence and a chloro-anœmic aspect; very frequently also by rheumatism of some form or other, but without any tendency to lesion of the peri- or endocardial membranes. Pathologically, it is marked by congestion or inflammation, with softening of the enteric mucous membrane, (particularly that of the stomach and duodenum), without any lesion of the Peyerian follicles, but with hypertrophies of the liver and spleen.

There is no fever so irregular as this in its course and symptoms. The disease prevails particularly during the spring and summer months, (less so, during the autumnal period of the year), and, generally, during years in which the Typhoïd form is in abeyance. It replaces, and is in turn replaced by that fever (typhoïd) and, sometimes, occurs concurrently with it.

The natives of the place are affected in a much less degree than those temporarily residing here; and, of these latter, the older residents appear to evince the greatest proclivity to the disease.

It affects, *par excellence*, young men, under 35, particularly those of rheumatic diathesis; next in frequency children; most infrequently, the aged.

To enter into the description of its symptoms more in detail:—There is invariably a preceding stage of dyspepsia, of indefinite duration, irregular bowels, acid eructations; disinclination for food, lowness of spirits and restlessness at night. Upon this state pyrexial symptoms supervene, sometimes suddenly, so as to resemble an attack of intermittent, and the patient seeks the hospital. The febrile symptoms are particularly prone to remissions of an irregular type.

* Dr. Edwards, who had practised at Lima, tells me that a similar, if not identical disease, is prevalent there. He prognosticated that the island ought to yield cases of yellow fever and, curiously enough, within a few months of this statement, two cases of bilious fever—presenting symptoms allied to yellow fever,—made their appearance.

† *Vide* cases at the end of Paper.

Almost invariably there is a nocturnal exacerbation, ending in diaphoresis—often profuse. The pulse, rarely below 80, often reaches 120, soft and voluminous.

The dyspeptic symptoms are well-marked—vomiting, or nausea, is generally present; pain, 3 to 4 hours after eating, referred to the œsophagus and stomach; invariably anorexia. The patient hawks up, in the morning, quantities of mucus, occasionally mixed with a little blood. This appears to come from the pharynx. Hematemesis is rare. The tongue is large, flabby, with slightly reddened periphery, and covered with a whitish-yellow, or a very thin, semi-opaque fur. What rarely happens in pyrexial diseases, the tongue in this is sometimes sodden and marked, laterally, by impressions of the teeth. It becomes glazed during the progress of the disorder. The tonsils are generally slightly congested, and their follicles prominent. A diseased state of the velum palati is often present. This part is relaxed and congested, and sometimes presents numerous minute opaline spots (aphthæ), or a thin, translucent, whitish exudation, which peels off, leaving a glazed reddened surface. A similar coating is occasionally found upon the gums, which then look spongy and project between the neighbouring teeth. Sometimes an appearance not unlike that of stomatitis ulcerosa appears. A highly intelligent military surgeon conceived, from the appearance of the gums in some cases, that a scorbutic condition of blood was present, and prescribed accordingly, without the least benefit however. The semi-opaque fur becomes a favourite nidus for the development of vegetable germs (the oïdium albicans). The saliva has generally an acid reaction to litmus. (The tongue must be previously sucked, for the mucous secretion of the mouth is normally acid.)

The bowels are irregular; sometimes confined, at others loose from attacks of colicky diarrhœa. There is often meteorismus—variable in degree and duration. The stools are dark and scybalous, or loose and mucous; sometimes light and deficient in bile. There is neither persistent gurgling nor tenderness upon pressure in either iliac region; but, almost invariably, tenderness in the neighbourhood of the epigastrium. Upon this state dysenteric symptoms occasionally supervene, the stools may then be scybalous, of small diameter, or liquid and dark, and covered with some mucus or a little blood.

The hepatic dulness is slightly increased; the lower margin of the liver is often the seat of dull pain upon pressure. The splenic volume is invariably increased; but not greatly so. No pulmonary symptoms ordinarily attend the course of the fever. The skin is at one time harsh, dry, and pungently hot, particularly about the afternoon; at another time (night) it is covered with perspiration, sour smelling, and acid to litmus.*

If any eruption belongs to the disorder at all it must be commonly absent, for I have not failed to examine carefully. All that I can say upon the subject of an exanthem is, that the medical officers have occasionally and very infrequently noticed a little pink spot or two, of not more than one or two days' duration, somewhere in the neighbourhood of the epigastrium, upon which a minute vesicle has appeared. A copious eruption of sudamina may make their appearance in this, as in other diseases attended by profuse sweating. The skin, besides being harsh to the feel, becomes pale, and of a yellowish anœmic aspect.

The conjunctivæ are often slightly tinged with biliary pigment. The expression is one of listlessness and depression. The face is generallypale, but, as a very mobile state of the nervous system attends the progress of the disease, the patient becomes easily flushed when spoken to.

Renal Function.—The average daily quantity of urine is rather diminished than otherwise—10 to 25 ozs. daily. Among its more common characters are: Acidity to litmus, average specific gravity 1020 to 1025; freedom from albumen; the presence of oxalates, urates, or uric acid crystals; copious deposits of urates of soda and ammonia, coloured pink by purpurine, are frequent. The presence of biliary colouring matter is often rendered evident by the action of nitric acid. Sometimes a highly nervous state attends this fever, not unlike the hysterical condition, and like it, attended with a very copious flow of pale, neutral, or alkaline urine of low specific gravity. As in the enteric fever, although to a

* It is a source of regret that the variations of temperature were not traced. The amount of work imposed upon the writer during the hot seasons, coupled with his own impaired health, prevented this being carried out.

much less extent, the amount of urea and uric acid excreted appears to be augmented. The aqueous excretion rapidly diminishes during the acute pyrexial periods.

Cerebral Symptoms.—Delirium was very rare and confined to the *most severe* cases. There is generally wakefulness, or the sleep is troubled by distressing dreams. From first to last there is *great depression of the spirits.* A restless manner also, which contrasts strongly with the listless expression of the face, and a disinclination and incapacity for mental exertion, are common.

General Course and Duration.—This state of things lasts from three to ten weeks or longer, during which time the patient very slowly, but surely, emaciates and becomes anœmic. If the depression of spirits be very great, he wastes commensurately. An imperfect remission, for two or three days, frequently occurs during the course of the disease; during which remission the patient expresses himself as immensely better, only to relapse into the same state as before. During convalescence, relapses are very frequent. The prevalence of dry polar winds, the occurrence of wintry or cold weather, act most beneficially; indeed, the latter (winter) generally cures the worst and most protracted forms. Equatorial and moist winds, particularly the sirocco, augment all the symptoms, which are also aggravated by high diet, meat, and stimulants. Tonics during the early stage are particularly ill borne; acids appear to be injurious; alkalis, although they seem to exert but little curative influence, are always well borne. The tendency of the disease is decidedly to recovery—a fatal issue being very rare indeed.

The description of this as a febrile disorder is beset with difficulty, admitting as it does of such a wide range, in the degree, severity, and duration of the symptoms. What I have written above will apply to ordinary cases, but with others it will be far otherwise. If, on the one hand, the more severe and sthenic forms pass into the bilious type, without any line of demarcation; upon the other, so mild may the symptoms appear, that the patient may never be confined to bed, and be all the while supposed to be labouring under a peculiar form of dyspepsia. There are some persons I know who will not recognize this variety as cases of fever at all, but will call and treat them as dyspepsia, and express no wonder at their patient's protracted illness, and the irregularities attending its course—because dyspepsia is intractable and irregular. There are four points, however, which can be made out, I think invariably, viz.:—1. A gastric derangement which refuses to yield to any treatment. 2. Great depression of the spirits, with a languid, listless, expression of face, out of all proportion to the other symptoms of the disease. 3. Slight pyrexial attacks, variable in their appearance, duration, and severity (so slight as to amount to a burning of the palms of the hands, and a feeling of stuffiness or feverishness at night), and often requiring a close enquiry for their detection. 4. Anœmia, slow and progressive, with a marked tendency to an attack of rheumatism or neuralgia (however slight in degree).

Convalescent Stage. It is now that the anœmic, but puffy-looking face, and the dejaded look attract attention. Supposing that no relapses occur, the patient rarely recovers perfectly without suffering from rheumatism or some form of neuralgia.

Such rheumatism takes one or other of the following forms:—1. Sciatica. 2. Rheumatic orchitis. 3. General rheumatism. 4. Intercostal neuralgia of the left side, attended with distressing palpitation.

Just as the unfortunate patient flatters himself that all is well, he will, with all suddenness, get an excruciating attack of sciatica; in rare instances there are the symptoms of a rheumatic spinal meningitis. The patient has great pain in the loins, back, and thigh; every movement gives him excruciating pain; he feels as if his back were grasped in a vice; and the spinal and lumbar muscles are the subjects of prolonged spasm, while percussion of the spinal column gives pain.

The second form—rheumatic orchitis—is not infrequent. In the course of twenty-four or forty-eight hours, after having had much pain in one or both testicles, these organs will swell up to the size of a small fist. There is generally some effusion into the sac of the tunica vaginalis. The scrotum becomes vascular, and the scrotal veins engorged. Only one case suppurated.

The third form appears as an arthritic or fibrous affection. One or more joints become puffy, and tender to superficial or deep pressure. The long bones are often tender also, as if the periosteum were engorged. The muscular tissues and tendons (fibrous rheumatism) are frequently affected. Muscular movement is of course attended with much pain.

These rheumatic affections are altogether peculiar, and quite distinct from the disease ordinarily so called. They seem as much allied to neuralgia as rheumatism, and are as frequently referred by the patients themselves to one as the other of these diseases.

The preponderance of the nervous element (pain) over any local vascular phenomena, and the paroxysmal character of this pain, are very marked. The effect of remedies, too, would lead to the inference that a neuralgic element is present. Neither the pyrexia, loaded urine, marked sweating, nor, generally, that swelling of the joints—so commonly the characteristics of rheumatic fever, for instance—are present. I have not seen, either, any cardiac disease appear.*

Although the state of the affected limbs is apt to be influenced by changes in the state of the weather, I have failed to make out that exposure to cold has been the exciting cause of a rheumatic attack. The exercise of the greatest care upon the part of the patient fails to ensure his exemption from this evil.

This rheumatic tendency seems to depend either upon the same causes that generate the febrile disorder, or to flow from the diseased state of the primary assimilative organs. I believe the latter.

If the presence of lactic acid in the blood be the proximate cause of rheumatism, may not this acid be generated in abnormal amount by the morbid state of the gastric membrane, and be absorbed from the stomach into the blood?

Intercostal Neuralgia is common. The pain is evidently connected with the intercostal nerves, (probably through some morbid implication of their sheaths), for it is felt along the course and at the periphery of the nerves, and pressure, at different parts of the intercostal spaces, increases the pain. Sometimes, through the intercosto-humeral nerves, pain is felt as far as the elbow and arm. With this there is almost invariably much functional derangement of the heart. It beats with sharpness and vivacity; the sounds have a ringing tone and, often, the number of the cardiac impulses exceeds those felt in the arteries at the radials. The heart's action, besides being very quick, is sometimes irregular. No morbid sounds (murmurs) are engendered, nor do the patients complain of dyspnœa. Such functional palpitation may set in with suddenness (after a dinner), and be attended with much anxiety and extreme nervousness. Furunculi sometimes appear, but far less frequently than after typhoïd fever.

Adenitis (bubo). The lymphatics often inflame. There will arise, in the course of a few hours after a short walk, enlargement of one or inguinal glands, which remain as indolent tumours, rarely, if ever, suppurating. The lymphatic system is left after the disease in a very irritable state, prone to inflammatory hypertrophy upon slight causes.

Besides anœmia, which often lasts a long time, there is a great tendency to melasma of the skin. Pigment is deposited about various parts, particularly where blisters or rubefacients have been applied. The face is somewhat bronzed, besides being pallid, and the features look rather puffy. This tendency to the production of pigment, is as marked as after typhoïd fever. It is probable that both the anœmia and pigmental deposit may be the result of what Virchow calls a leucocytosis.

Complications. Any local disease may arise during the course of the fever, but they are rare compared with what we see in enteric fever. A severe bronchitis occasionally, though vary rarely, makes its appearance. Pneumonia and pleurisy are very exceptional, and confined to the worst cases; pulmonary disease becoming more common as the cases approach the bilious type. When there is a pre-existing cirrhotic state of the liver, or gastric ulceration, hematemesis may arise, but it stands in no necessary relation to the disease.

* Rheumatic affections are very common in the Mediterranean during convalescence from febrile diseases; but this is peculiarly the case in the disorder under consideration.

One severe case of this fever which I attended, was in the person of a young lady, who nearly lost her life from very profuse passive menorrhagia.

Upon two occasions, in protracted cases, the lower extremities became somewhat œdematous and purpura appeared. When there has been any pre-existing renal affection, this organ will give evidence of congestion, and albumen may appear and disappear in the urine, in connection with the presence or absence of the sharper febrile accessions.

One of the few fatal cases I witnessed suffered from such recurring attacks of albumin uria. He was a civilian of gouty diathesis, however.*

Nature of the Disease. A consideration of this disease—its long duration, comparative non-fatality, the absence of exanthem, pulmonary disease, marked diarrhœa, and those abdominal symptoms characterising typhoid—will, I think, altogether remove it from that disease with which, at one time, I confused it. The morbid anatomy, also, proves that the lesions discovered are not identical with those of enteric fever. To a certain extent, it corresponds with Wünderlich's description of erythematic gastritis. Still, the duration, regular course, febrile symptoms, their remissions, the relapses and sequelæ, remove it from any mere local gastro-duodenitis or gastro-enteritis. The nearest approach to the elucidation of its pathology is to be found in Dr. Peacock's admirable lectures upon "The Remittent Fevers prevailing in the Metropolis." Dr. A. Anderson, of Glasgow,† has described a gastric fever apparently identical with that now described.

The similarity of the disease to relapsing fever will, of course, suggest the idea of its identity with that disorder. Dr. Parkes was kind enough (in reading this paper) to remark upon this. I must state here, that neither Dr. Edwards nor myself could determine that the fever in question corresponded with either the enteric or relapsing forms. The reasons upon which we came to that conclusion flow from what follows.

TABLE of points of Similarity and Contrast between Gastric Remittent and Relapsing Fever.

GASTRIC REMITTENT FEVER.	RELAPSING FEVER.
1. Sporadic, endemic, occasionally epidemic.	1. Epidemic generally, with wide intervals.
2. Attacks all classes—rich and poor.	2. The poor, ill-fed, and the inhabitants of badly-ventilated districts, more commonly.
3. Has some reference to climatic agencies, gradually operating; but still more connection with local miasms, generated in ill-drained and damp houses. The worst cases appear to pass into bilious fever without any line of separation.	3. Unknown. By some supposed to be allied to yellow fever.
4. Very insidious, as a rule, in its mode of attack. Invariably preceded by dyspeptic symptoms.	4. Sudden in its onset. Pains in limbs, high fever, rigors, and vomiting.
5. Bronzed aspect succeeds, rather than precedes, the attack.	5. Precedes the attack frequently.
6. Very prolonged and uncertain in its severity and course; rarely (if ever?) terminating critically, but, having reached its culminating point, very gradually subsiding into convalescence. Patients may be ill for months.	6. Regular and definite in its symptoms and course; often terminating critically; five to seven days in its duration.

* In attempting to render a complete sketch of one's whole experience and observation of any given type of disease, it must be remembered that the relation can scarcely fail to appear exaggerated as applied to an individual example, however truthful it may be of the whole series. The sum total of the symptoms will, almost never, occur in any given case, and each symptom will possess varying degrees of severity and significance.

† *Vide* Remarks.

7. Relapses, very frequently repeated, and at such uncertain intervals as to defy classification. The intervals between such relapses having the character of *relative*, and not *absolute* health. The fever partaking, indeed, much more of a remittent than a relapsing type.	7. To recur (almost invariably) after a similar period (five to seven days) of apparent recovery. Second or third relapse infrequent.
8. Jaundice, (when early, only seen in severe form), generally very slight.	8. In one-fourth of the cases, jaundice: often deep.
9. Epigastric tenderness almost invariably present. The gastric symptoms form by far the most important phase in the clinical history of the disease: slightest indiscretion of diet inducing relapse. The mild cases appear as a febrile dyspepsia, and may run their whole course without confining the patient to bed.	9. Epigastric tenderness. Gastric symptoms not so evident. The pyrexial attack sharp, and much more marked, necessitating confinement to bed.
10. Delirium rare; only apppearing in severe cases, conforming to the bilious fever type.	10. Delirium common, just prior to crisis.
11. Patients symptoms much affected by conditions of the weather.	11. No such influences observed.
12. Fatal issue rare, and then not at an early date, (save in the pernicious bilious fevers), nor sudden.	12. Fatal issue very rare. Tendency to sudden death has been observed.
13. Treatment of little avail. Case protracted, uncertain, and deviating from day to day, and from week to week.	13. No treatment influencing the course of the disease, which is almost undeviatingly fixed.
14. *Sequelæ*. Peculiar forms of fibrous rheumatism, anœmia and, rarely, furunculi. Ophthalmia never observed.	14. Rheumatism, a common sequela; also post febrile ophthalmia, furunculi, parotitis.
15. *Post-mortem* appearances. Vascularity, inflammation or softening of stomach and duodenum and, less frequently, of other parts of the enteric membrane. No follicular disease; sometimes slight enlargement (succulency) of the mesenteric glands; colon occasionally affected; splenic enlargement (not great); uniform mahogany aspect of liver; a bloodiness of the tissues, and a mottled (purpuric) state of the pulmonary parenchyma.	15. No special lesion; enlargement of the spleen most constant; slight pulmonary congestion; gall bladder full of dark bile; hepatic enlargement; blood fluid throughout the body occasionally seen.

When this form of fever attacks children, (which it frequently does), it is apt to leave behind it an enlarged condition of the spleen, difficult to remove. In these patients it becomes, I verily believe, impossible in many cases to distinguish it from enteric fever or strumous dyspepsia.

If, clinically, we find great difficulty in drawing the line between the regular exanthematic typhoïd, the remittent gastric and bilious fevers, so gradually do we pass from one to another, there are likewise pathological connections and points of affinity between them—particularly between the gastric, bilious, and typhoïd types. It is now generally held that the spleen, Peyerian, and solitary glands, the tonsils, and lymphatic glands—if not even the liver—have such anatomical and morphological relations, as to be almost homologous one of another and subservient to similar physiological functions. While the spleen, Peyerian and mesenteric glands, are the special seats of disease in enteric fever so, in the gastric, do we find the spleen, liver, and often the tonsils, are affected. In both, the gastro-enteric membrane is involved: of the small intestine, as a concomitant or successive process to the grandular disease, going on to ulceration, in typhoïd; and in the gastric, congestion and inflammatory softening of the gastro-duodenal and, less commonly, of the small intestine,

without ulceration, with very rarely, swelling of the mesenteric, and never of the Peyerian glands. The dysenteric process is more common to the gastric than to the typhoïd fever. Both tend to pulmonary disease, but most unequally so. While a very large number of cases of gastric fever altogether escape lung disease, those suffering from typhoïd rarely, if ever, do. While bronchitis, lobular injection, and purpuric staining are found in the worst forms of gastric fever, extreme congestion, lobar and lobular pneumonia, pleuritis, one or all, are almost invariably present in Typhoïd. An anœmic condition of system, attended with pigmental deposits, is common to both.

Upon the causes affecting the production and prevalence of this disorder, I would now offer some remarks. I fancy that we may perceive the operation of two agencies:—1, the effects, whatever they may be, induced by residence in a hot, moist climate; 2, certain localised conditions connected with drainage and dampness.

The climate of Malta, during the summer and autumn, approaches to that of the tropics, and exerts a similar influence upon the system. Most English residents suffer during the hot season. Atonic dyspepsias, attended with enlarged spleens, and short, sharp febrile attacks, resembling intermittent, are common during that period of the year. Neuroses, particularly of the sympathetic system, such as gastrodynia, &c., are frequent. Anœmia, and a gradual but marked deterioration of the constitution, are the results of long residence in the Mediterranean. The children of the English residents afford a valuable and delicate test of this. They become anœmic, lose their appetites, and slowly waste during the hot season. Ague is not prevalent as a disease, but aguish patients are cured with difficulty. Whether all this be the result of malaria, it is difficult to determine; but that it is the result of "climate," there can be little doubt.*

The term malarious disease is not here used, as identical with that produced by marsh miasma, but as a disorder maintaining the same pathological affinities, operating upon the same system (sympathetic), and requiring a similar treatment to intermittent and remittent fevers.

There is much reason for the opinion, that many febrile, gastric, and disorders of the organs of primary assimilation, as well as neuralgia and dysentery, may be as much exponents of malarious influence, as true Ague or Remittent Fever.

Whatever may be the influence of a Malta climate upon English residents, there can be no doubt about the high temperature of its summer months, the rapidity and amount of evaporation going on at that time, the porous nature of the sandstone, and the defective drainage, common to the private dwelling-houses as well as to the garrison buildings.

It must be remembered that the facts connected with the prevalence of malarious disorders do not negative a view that such diseases may be generated by almost any moist surfaces in process of drying; that some product of organic decomposition is necessary to its production, may be, and probably is true.

If I were asked to indicate the cause of this disease, I would suggest the defective house-drainage. Without wishing to speak at all dogmatically upon this point, I would go further and say, that the products resulting from fœcal decomposition of water-closets, &c., are peculiarly the source of typhoïd fever, and the evaporation from damp houses, defective in surface and other drainage, producing other than fœcal stinks, are the agents in the gastric remittent type. I have no evidence whatever of the disease just described being contagious.†

* There was, a few years ago, a district at the end of the Grand Harbour here of a very marshy character, and remittent and intermittent fevers were so prevalent, that the Maltese were unable to reside in or near that locality. It has since been drained and cultivated, and disease is now no longer rife there: still it may exert some influence. The crews of the vessels of her Majesty's Navy anchored near this locality, occasionally, suffer from malarious diseases. One of the first and few fatal cases of gastro-enteric fever, without any follicular disease, happened in the case of an Assistant-Surgeon of her Majesty's ship "Conqueror," whilst stationed there.

† I was not aware that there was any disease in Great Britain answering to the above—that is to say, as distinguished from the enteric or relapsing fevers; but I

Bilious Fevers.—From the last-described gastric remittent to bilious fevers the transition is easy, for the difference, though great, is still but one of degree.

If the prevalence of gastric fever reaches its acme in summer, becoming less in autumn, and ceasing during the winter, (the two latter seasons marking the prevalence of typhoïd), so does the bilious type of fever. Yellow fever, as is well known, is confined to certain habitats, although not constant in these, but occurring from time to time. In Gibraltar cases of paludal fever occur annually, and yellow fever has been occasionally and very irregularly epidemic there. A medical officer, late of the Royal Artillery, who had resided for many years in Malta, declared that he had seen cases of yellow fever there. The following cases, occurring in the Royal Artillery, are interesting with reference to this subject. The affected individuals were residents in a barrack which subsequently furnished two or three cases of enteric fever, presenting the uncommon symptom of jaundice.

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have recently (October, 1861) perused with great pleasure the very practical and suggestive little book ("Ten Lectures Introductory to the Study of Fever:" Churchill), by Professor A. Anderson, of Glasgow, upon Fever. I cannot forbear from extracting the following remarks:—Dr. Anderson, after stating his opinion that gastric fever has an existence distinct from enteric, and that it possesses special characters, and after indicating its constant connection with an inflamed or irritated state of the mucus membrane of the stomach and bowels, says, "This gastric fever is most irregular in its stages, forms, degree, and symptoms, and, therefore, when you have to do with it you ought never to give any positive prognosis as to its course and duration. It may be short, it may be very tedious—weeks sometimes elapsing wearisomely, while the patient gets, indeed, no worse, but is certainly not any better. It may attack persons of any age, the youngest child, or the grown-up man. Its invasion is, for the most part, insidious and gradual, so that some have called certain form of it "Walking Fever," because the patient may go about for days complaining of vague discomfort—miserable, he knows not why; having no particular complaint to make, yet most unhappy; and this goes on day after day, until at last it becomes plain that he is in fever. The symptoms, as I have said, vary much, but through them all continues this undefined wretchedness and depression."

Again, "If Typhus lingers on beyond a fortnight, we know that there must be some complication, or that some sequelæ has occurred. If enteric fever be continued beyond three weeks, we know that it is prolonged by the existence of intestinal ulceration; but gastric fever may go on week after week most tediously, and yet be still uncomplicated gastric fever. Sometimes the cases are so slight that it is only by observing the tongue to be always loaded, the evacuations from the bowels always unhealthy, and that every night there is an increase of febrile heat, that we can convince ourselves of the patient's being really ill. These cases are as annoying as they are tedious." Dr. Anderson thinks, that it has a slight, fugitive, ephemeral sort of exanthem, which, however, he says is rarely observed. He alludes to the frequent occurrence of this disease among children, as an infantile remittent fever, quite distinct from the enteric fever, stating that the disease puts on a distinctly remittent character, and thus approaches the malarious fevers. Sometimes, indeed, gastric fever puts on a very remarkable aguish character. I remember one case in which a child had been exposed to the emanations of an ill-drained house, which was surrounded by rank vegetation. He took gastric fever with all the symptoms I have described. This was followed by chilly fits coming on periodically, and to which he was long afterwards subject." Dr. Anderson concludes, that gastric fever depends more upon "effluvia" as a cause than anything else. To conclude our quotations —"Thus, while the three diseases we have been considering (typhus, enteric, and gastric) are linked to the eruptive fevers by the almost perfectly exanthematous types, they attach themselves through gastric fever to those which arise from malaria; for, both in respect of its occasionally endemic origin, and of its periodic character, gastric fever draws itself very close to ague and malarious remittent, and so we are led on to bilious fevers."

It will be seen that the differences between the gastric remittent, and this gastric fever described by Professor Anderson, are such as can be accounted for by the very marked differences of climate, &c., between Glasgow and the Mediterranean. Dr. Anderson makes no mention, however, of rheumatism in connection with this fever. "Could we," said a medical officer, to whom I lent Dr. Anderson's book—"Could we take rheumatism from his description of relapsing fever, and add it to that of his gastric fever, we should have our Malta fever."

Two gunners bathed in the muddy part of the Great Harbour. About ten days afterwards, both became the subjects of fever, and were admitted into hospital. The first was a very fine muscular man; the symptoms were slight at the commencement; his illness lasted nine days. Upon the third day, he complained of great frontal headache; his pulse (full) was 90; constipation and some vomiting were present. The last symptom (vomiting) increased and became urgent, until ultimately the matters vomited were ejected in an arched direction, with little or no movement or uneasiness. The skin became lemon yellow from jaundice; the conjunctivæ also were yellow, and at the same time much injected. This icteroid hue, I was told, was deeper than what ordinarily appears in the West Indian fever. The bowels were moved with difficulty. About 60 hours before death, the vomited matters were dark, resembling a mixture of soot and water. Examined by microscope, these were found to ontain numerous altered blood discs, though insufficient in amount to account for the depth of colour. The pupils became contracted, the eyes more injected, the countenance venously-dark and oppressed-looking. Hæmorrhage from the nose, mucous membrane of the mouth and gums, with purpuric spots upon the extremities, occurred; great restlessness and delirium set in, with incessant hiccough. The urine, which was nearly quite suppressed, was highly albuminous. From this state he passed into coma, with the long, slow, sighing breathing, seen in cholera asphyxia. The motions passed were very dark and melænic-looking.

Autopsy. Extreme lobular congestion of the lungs, with a purpuric mottling of those organs, approaching to apoplexy; black vomit (?) in the stomach, the coats of which were not markedly changed; a great deal of racemose and punctiform redness of the duodenum (inflamed) with a diffused redness of the lining membrane, from blood staining.

The liver was rather large, and of a uniformly dark mahogany hue, structurally healthy, without any fatty degeneration of the cells: the common and hepatic ducts, patent; the small intestines venously congested, their glands healthy. The spleen was much enlarged, of a violet-brown hue externally; the interior was softer than normal in places, with localised dark spots, apparently extravasated blood into the parenchyma of the organ. Kidneys much engorged in their cortical portions. The remaining viscera were healthy.

The blood was thick, dark, and fluid. It struck me particularly, that there was a more than common bloodiness of the areolar tissue of the body generally.

My friend Dr. Edwards, whose experience of yellow fever in Lima lent weight to his opinion, thought this a case of yellow fever during life. He made microscopic examinations of the various gland and other tissues without, however, finding the appearances he had been led to expect.

The other case ran through a course almost identical with that described, but was less severe; and after a very narrow escape for his life, he recovered, making, what is unusual after yellow fever, a very protracted convalescence, and suffering from acute orchitis of both testicles, as a sequela of the disease.

Within a week after the admission of these cases a third occurred from the same barracks, suffering from a fever, having curious diurnal exacerbations. Jaundice and incessant vomiting set in very early: afterwards delirium appeared, and the renal functions became partially suppressed. He died eight days after admission, apparently from urœmia. A *post-mortem* proved this to have been a case of typhoïd fever, and this disease (typhoïd fever) shortly afterwards became epidemic in the garrison.

One of the officials of the hospital (not engaged in the treatment of the sick) was subsequently attacked with a bilious type of fever. The disease commenced in his case with an ordinary catarrh, and a patch of herpes labialis. The symptoms were fever, suppressed secretions, headache, drowsiness, feeling of oppression, jaundice, vomiting, and constipation. There was no suppression of the urine in this case. He recovered after having been ill for about ten days.

The last case I shall record occurred in the 22nd Regiment. Through the kindness of Dr. Adams, who was invariably ready to aid me in the prosecution of any subject, the *post-mortem* examination was an exhaustive one. A young man, who had been feeling somewhat unwell and depressed in spirits for some weeks, was admitted into hospital with symptoms of fever and gastric derangement. The pyrexia was not great, nor were the symptoms severe at the onset.

About the third or fourth day he became jaundiced; the splenic and hepatic extent of dulness had increased; there was tenderness of the left lobe of the liver, and in the epigastric region; much irritability of the stomach was present; the bowels irregular (confined); stools dark and bilious. The expression of the face was one of languor and depression; the cheeks rather flushed. Pulse varied from 90 to 125 during treatment; there was an increase of pyrexia towards night; urine was portery, from biliary pigment, but non-albuminous. Upon minute enquiry I gathered that his illness had come on very insidiously. He had felt depressed in spirits, with little or no appetite, and had slept badly, from feeling hot and stuffy at nights—nevertheless, he continued at his duty. He had one rigor, followed by sweating, just before he came to hospital. The jaundice gradually deepened; the intestinal excretions became more and more unhealthy. After a good deal of physical restlessness, about thirty-six hours before death he became delirious, and soon after died.

Autopsy.—A hyperœmic state of the stomach, particularly about the smaller end. The mucous membrane appeared softened, and was covered with a thick secretion of very adhesive mucus: in places it was much blood-stained. The duodenum was red and inflamed, with injection of the smaller vessels, and much mucus upon the surface; the smaller bowels were distended with gas, and in places were also much injected; spots of racemose and punctiform redness with blood-staining here and there appearing. The villi were hyperœmic. The bowels appeared of a dirty bluish aspect, from venous congestion, as viewed from the peritoneal surface: the large intestine was contracted and empty. No glands were affected, save that the small solitary glands of the large bowel were, perhaps, unduly prominent. The mesenteric glands were, also, a trifle larger than normal, and yielded much fluid, on section. Gall bladder full of dark bile: ducts patent. Liver large (not weighed). It was of one uniform dull, mahogany hue, the lobules being very indistinctly defined. Hepatic veins moderately injected; portal canals congested. Upon the surface of the organ were some whitish spots, evidently from pressure of the adjacent ribs. In the interior of the gland were some hæmorrhagic spots of dark hue and friable consistence. Microscopic examination of liver cells showed that, in addition to the normal amount of fat, the liver cells (at least, so they appeared to me) were more than usually granular. Spleen much enlarged, of a dark violet hue externally, and variously mottled—in many parts of a dark-brownish colour, in others bright red. This appearance was maintained after exposure to air. The splenic parenchyma had numerous apoplectic spots, apparently true extravasations of blood; the splenic trabeculæ of the red parts, contained the ordinary blood globules in a yellowish fluid, while the darker portions, in addition to irregular and shrunken blood discs, contained large nucleated cells, larger than blood globules in size, and containing opaque pigment granules. I could determine nothing as regards the so-called embolism. The sections were made with Valentin's knife, and examined while fresh, or after the addition of glycerine. Of the nature of these microscopical appearances I can say nothing.

Cranium.—The pia mater slightly injected. Upon the posterior and right lateral aspect of the cerebellum was a localised patch, the size of a florin, in which the small venous radicles were full of dark blood. At this part numerous spots of extravasated blood were observed, giving a speckled appearance, and of the hue and character of purpura spots. The grey matter at this part was softened, (? from imbibition, as nothing appeared upon a microscopical examination to indicate the cause.)

Chest.—Heart distended, with dark fluid blood upon the right side; less so upon the left. Subpericardial veins full.

Lungs large, full, and injected. Upon the posterior aspect, of a dull ruby hue from venous congestion. The whole tissue of the lung had that peculiar mottled speckled aspect, so indicative of a blood disease. Upon the lower part of the right middle lobe were spots of pulmonary apoplexy, and upon the left lung (its lower lobe) the same existed, but less in degree. Bronchi contained a good deal of mucous secretion, and were of dull-red aspect internally. This case appears to me to have partaken of the nature of a gastric remittent at first, but to have rapidly advanced to the bilious type of fever.

In concluding, I cannot help entering my protest (with all modesty and

humility) against the line of practice indicated by that much to be lamented and highly endowed man, the late Dr. Todd. I have myself felt strongly the evils arising from that very facile process of following a leader, however eminent:—1. In stultifying the study, and cramping the domain of medicine as a science and art, by preventing the exercise of that wise eclecticism and judgment, which are the only distinguishing marks between the merest empiricism and an educated rationalism. 2. In the baneful effects which arise from using stimulation as the essential basis of treatment of all disease.

If the question were one of stimulation, under the idea of supporting the vital powers, or non-stimulation in *all* pathological states of the system, I verily believe that the latter course would be the most beneficial. The questions must ever be, when, under what circumstances, and to what extent, shall stimulants be used in a given case, and it is from a rational solution of these that success in practice may be expected to flow. I can state, pretty positively, from the result of a tolerably extended series of observations, partaking almost of the nature of direct experiment, that a stimulating treatment in all cases and stages of the febrile diseases of this climate (particularly in those of enteric fever) is a measure fraught with evil consequences to the patient.

The early exhibition of stimulants, it must be remembered too, robs us of a very powerful aid at the time when stimulants are certainly needed and of the greatest benefit. It is during those stages of disease, when asthenia and anœmia predominate, that alcohol makes so direct an impression upon the system for good; but such is not the case if it has already been given, in anticipation of symptoms which they will fail to prevent. No more philosophical remarks are to be found upon this head than those made by Dr. Wilks, of Guy's, the bearing of whose observations are as far removed from those of Dr. Todd as possible, considering that the two men were speaking of the treatment of the same diseases with the same remedies.

The treatment of typhoïd and gastric fevers differs essentially from that of typhus, as regards the benefit which occurs from either a large amount or an early exhibition of stimulants.

The indications for *the treatment of enteric fever* may be founded upon general principles, drawn from the consideration—1st, of the special physiognomy which each individual case will present, as regards temperament, habits of life, mental characteristics, &c.; 2ndly, by remembering, that the disease is "a fever," running a definite and (more or less) protracted course, presenting various local inflammatory processes during its progress, and tending to destroy life—(*a*) directly, by the effects of the poison upon the nerve centres, with little or no vascular reaction in the animal system; (*b*) by some one or more of the intercurrent lesions, set up in the tissues by the morbific matter in the blood, such as softening, inflammation, and ulceration of the intestine, bronchitis, pneumonia, &c.; (*c*) by asthenia and anœmia, the result of the impaired nutrition, vitality, and exhaustion induced through the eliminative acts of the poison on the system.

By far the larger number of cases require no stimulation whatever during the earlier stages of febrile disease; but rather a fever diet, simple saline and diaphoretic febrifuges, with or without Dover's powder; the regulation of the bowels by the mildest aperients, and, when the patient is very restless at night, a full dose of opium will be found to act beneficially. Opium must, however, during the earlier stages, be given warily and only with the view of meeting some direct indication.

During the later stages of the disorder beef-tea, veal broths, &c.,* with wine or brandy, may be given in regular, and frequently repeated doses, with the greatest possible advantage. At this time the exhibition of an opiate at night sometimes operates like a charm, even in cases where the pulmonary symptoms are severe. Dry cupping, local depletion, fomentations, counter irritation to the belly and chest, are weapons to be used with advantage. Of

* I do not think well of milk-diet, in fever cases, as it can only be obtained from goats in Malta. In four or five instances patients, after suffering great pain, vomited large pieces of curds, moulded sometimes to the shape of the bowel (? duodenum).

quinine I can only say, that after many trials in various doses I cannot find that it exerts any directly curative or beneficial influence, either upon the symptoms or course of the fever, useful as it is for the debility consecutive to the disease; neither have I been able to satisfy my mind that emetics have any tendency whatever to cut short the disease.

Treatment of the *Gastric-remittent form.* In many cases of this disease I believe the best, and often the only way, to remove the diseased action, or cut short a prolonged convalescence, is removal from the Mediterranean.

When the attack is comparatively slight, the more the patient is encouraged to use some exertion, physical and mental, the better, but in most cases, of course, this is quite out of the question. A hopeful expression and cheerful tone upon the part of the medical attendant are decidedly beneficial in counteracting that morbid despondency which always exists. Attention to ventilation, and the maintenance of a cool state of the sick ward or room, are important, not only indirectly in increasing the comfort of the patient, but in beneficially influencing the course and symptoms of the disease. The diet should be very light, small in quantity, and the simplest in quality. Farinaceous food, with an allowance of soup, chicken, fish, and boiled mutton, as these can be borne. Succulent fruit is both agreeable and beneficial: claret likewise. Generally speaking, all stimulation, whether by alcohol or high and full diet, is particularly ill borne: the stomach refuses to digest food. A treatment of the disease upon the assumption that the depressed vital powers must be sustained by a liberal supply of stimulants, beef-tea, &c., is erroneous. The employment of such measures is only to be followed with the view of meeting some very plain indication, or in protracted cases, or during the later stages of the disease.

Quinine and tonics of all kinds almost invariably disagree with the patient, during the earlier stages of the disease. Mineral acids of all kinds are particularly ill borne. Alkalis (soda and potass), with or without a vegetable bitter, such as gentian, quassia, or columba, agree remarkably well. Quinine, administered with some alkali, is one of the best means of exhibiting that tonic. The occasional exhibition of a mercurial (calomel), combined with ipecacuan and rhubarb, or colocynth, appears to be very useful.

The course of treatment which I have been led to think the best comprises the following measures:—

1. The occasional exhibition of an emetic in the morning. If portal congestion be present, which it generally is, and the motions are disordered, benefit will certainly be obtained from a calomel pill, such as indicated above, with or without the extract of henbane.

2. Counter irritation over the epigastric region, by means of some liniment, such as croton oil. If the case approaches the bilious type of fever, and the tenderness of the hepatic and gastric regions be marked, cupping, at an early stage, appears to afford much relief.

3. Lemon or lime juice in water as a beverage. The use of a mixture containing a preparation of soda and chlorate of potash.

4, and lastly. Quinine is first given tentatively, combined with an alkali, and, if it be found to agree, it should be continued; if not, some bitter vegetable infusion may be substituted for it. Should the remissions be well marked, and the gastric irritability great, quinine may be given in enemata.

During convalescence the citrate of quinine and iron, with strychnia, appears to be an excellent combination.

Narcotics (except henbane) are to be avoided, unless for the attainment of some specific object, when the Pil: Saponis c Opiô, or the Liq: Opii Sedativ: appear to be the best.

I am bound to say that I do not think the disease is ever cut short by any medicine; indeed, remedies exert but little influence over its course.

Treatment of the Rheumatism.—As the rheumatic affection possesses so many points of difference from ordinary rheumatic arthritis, so does it appear to be little influenced by the remedies which are so useful in the latter.

Local applications for the relief of pain, with remedies adapted to the improvement of the health, appear to be the most useful.

Attention to the state of the bowels, and the exhibition of quinine, or quinine and iron with alkalis, seem to me to be the best general remedies.

Small blisters applied at the seat or in the course of the pain and, afterwards, dressing the blistered surfaces with morphia, procure relief.

In most cases the hypodermic injection of morphia, or belladonna, has relieved the patient's agonising pain from sciatica and lumbago; but in only two cases was this plan of treatment at once and permanently curative. In a few cases it failed of giving any relief, but in most it purchased freedom from pain for twenty-four or forty-eight hours.

Should the anœmia be great, and the splenic volume remain increased, then one of two things will cure:—change of air, away from the Mediterranean, or the approach of the cold wintry weather.

Treatment of the Bilious Type of Fever.—Upon the treatment of this type of fever I would make a few remarks. As soon as the type is diagnosed with tolerable certainty, and during the stage of oppression which ushers in the more sthenic symptoms, let the patient be cupped over the region of the liver and spleen to eight or twelve ounces; allow cupping glasses to remain, also, for the purpose of dry cupping. Administer a dose of calomel (gr. iv-v), and if the bowels are not open, give $g^{tt.}$ i-ii of croton oil every two or three hours until free action has been procured. Whilst the glasses are drawing, surround the patient with a hot air or steam bath (easily enough managed), to induce great and rapid diaphoresis, if possible. Vomiting, or gastric irritability is sure to be present, therefore, the less the patient takes the better, and that in very small quantities, frequently repeated. Allow ice to dissolve in the mouth, and after the bowels have been freely acted upon, give small quantities of ice and champagne (equal parts champagne and iced water). If hemorrhage takes place from the gums and mucous membranes, turpentine may be given in scruple doses every hour. During the whole treatment let a large injection of warm water, with grs. x-xxx quinine in it, be administered every three or five hours.

As the gastric irritability increases, and the pulse acquires a jerky hemorrhagic character, let a large blister be raised over the stomach and liver by means of a blistering liquid, a poultice or fomentation directly following its application; this saves time and has less tendency to induce strangury. Emetics I do not advise, as they are apt to induce the vomiting which is a general symptom of the disease, and so difficult of control.

Case of protracted Gastric Fever of anomalous Character.

Of the nature of this case I now entertain no doubt; it left a vivid impression upon my memory.

Gr. McB., ætat 30.—A married man, who had been many years upon the station, presented himself at the hospital one morning, stating that he felt weak and out of sorts. He manifested a great deal of languor, and an unwillingness to enter into any detail. He had a nervous agitated manner, and an anxious eye, which contrasted strangely with his otherwise listless expression. There was no great debility and the skin was not hot; he had suffered no pain, but persisted in complaining of a sense of weariness. The tongue was rather foul. There was slight epigastric tenderness upon deep pressure, and the hepatic dulness was perhaps a little increased. Anorexia was present, and what he did eat, he said, disagreed with him. The bowels were irregular, sometimes confined, sometimes the reverse. His pulse was 104, and weak, and when he became agitated, was much quicker. I could detect no trace of disease to account for these symptoms; I tried to account for them upon the assumption of secret drinking, but I was wrong. He was put upon quinine, good diet, and wine, but these caused such discomfort and he became so hot and feverish, that they were discontinued. One afternoon, I found him lying upon his bed, (he objected strongly to remain in bed), complaining of feeling "stuffy." His hands were very hot, and his forehead was perspiring. He said that he had sometimes felt "chilly of a sudden," and generally got better at night, he thought. Quinine, and afterwards arsenic, were administered without any benefit. For a day or two he would appear a little better, but still very depressed in aspect and spirits. In this state he continued, I am afraid to say how long, sometimes better, sometimes worse. The motions were dark and disordered, variable in colour and consistence, and the tongue was (in a slight degree only) coated. It was noticed that he had trifling attacks of pyrexia every evening; he did not always

feel chilly beforehand. The thermometer, used by himself, on one such occasion, rose to 101 in the axilla. The quantity of urine varied in amount, but nothing abnormal was present in it. As his motions were disordered, his tongue a little coated, and the epigastric tenderness persisted, he was carefully dieted, and treated by an occasional purgative, alkalis, and counter irritation to region of stomach. Under this plan he certainly seemed to do better than any other; nevertheless, he made no steady progress from day to day, and the dyspeptic symptoms, variable in degree, were persistent in character. The state of the weather seemed to influence him, as he was worse when it was warm and moist; better, when there was a polar wind and clear atmosphere. He had one attack very like an ague fit, but quinine did no good. At last he seemed to improve, very, very slowly. The conjunctiva became a little yellow from bile at a late stage. Haunted by the self-same expression of languor and melancholy in this man's face, I thought at one time that there might be some latent cerebral disease, or that he was rendered unhappy by confinement. I sent him to his wife and treated him as an out-patient. During convalescence, he had neuralgia of the left brachial plexus, with tenderness of the muscles supplied by the external cutaneous nerve; afterward slight sciatica of the same side. He appeared very anœmic, and his pulse remained uniformly quick. The splenic increase was not so great as to account for this state. After remaining nearly four months altogether under treatment, he was invalided to England, where he rapidly recovered.

I am now certain that this man's disorder was protracted by my injudicious treatment, particularly in dieting; but I had not then any experience of the disease.

Abstract of Fatal Case of Gastric Remittent.

Bombr. M.—Residing at Floriana. A tall spare man of fair complexion, light hair, blue irides, and lymphatic temperament. Admitted October 23, 1860, complaining of symptoms of a dyspeptic character, combined with a sense of great debility and nervousness. He was an abstainer, but had once drunk hard. According to his own account he had been ailing for some time (five or six weeks). His aspect was anœmic. His pulse quick (ranged from 100 to 115), soft, voluminous; but little heat of skin. His nights had been restless, and his sleep perturbed by dreams for the last fourteen or fifteen days. There was present from the very first a state of tension of the nervous system—a sharpness in responding to questions, and a hurried manner of executing any movement, not unlike what is observed in delirium tremens.

Upon the morning of 24th, it was reported that he had passed a comparatively sleepless night, and had "shouted" a good deal, apparently under the influence of a dreamy kind of delirium. He had perspired profusely. It was now noticed, that he was somewhat deaf, which symptom, although it varied in degree, was present throughout. The skin was then hot, pungent, and dry. No exanthem was ever observed. Tongue large, marked laterally by the impressions of the teeth; whitish-yellow fur on dorsum, with red tip and edges. The abdomen was not tub-shaped nor tympanitic, but concave rather than otherwise, until within thirty-six hours of his death. A good deal of epigastric tenderness was present, but there was not the least tenderness in either iliac region, nor any sense of gurgling there. During his illness he vomited twice, but made no complaint of this as a symptom. Bowels, generally confined; stools yellow (he was using milk diet). Splenic volume, increased; hepatic dulness, also (slightly). The pulmonary resonance not impared, save over a part of the left supra scapular region; sibilant and subcrepitant râles were heard over whole chest. Respiration, 30. No abnormal cardiac sounds. Pulse, uniformly high, was very soft and jerking. He sweated much at night. At the morning visit, the pyrexial symptoms were relatively slight, but a febrile exacerbation set in every evening.

The conjunctiva became slightly tinged with bile pigment, twenty-four hours before death. He did not complain of headache; there was, however, a good deal of noisy delirium each night. Such was the character the symptoms presented. Early in the morning of November 1st he had a prolonged shivering fit, resembling the cold stage of intermittent. He died at 11·30 P.M., same day, by mixed coma and asthenia.

Autopsy. Head.—Not opened.

Chest.—Pericardium healthy, about 3 oz. of fluid in sac. *Heart* large, with much fatty deposition upon the exterior; structurally and microscopically, healthy. Left ventricle, flaccid; small amount of blood within its cavity. Right side, full; valves healthy.

Pleuræ.—Left, universally adherent; right, partially so, by old adhesions.

Lungs.—Did not collapse upon exposure. The *right* was covered with minute spots of ecchymosis over the surface, and similar extravasations were found in the interior. It was highly congested and infiltrated about the base with bloody serum. A spumous and bloody fluid exuded on section, but the lung was crepitant. Mucous membrane of the bronchi, red and softened; much fluid in the tubes.

The *left* lung corresponded in its anatomical characters with the above, save that the amount of pulmonary apoplexy (?) was less. The posterior aspect of the upper lobe was much congested and contained blood extravasations.

Liver. Large, mahogany coloured. Its red and yellow parts well marked; not greasy. Portal vessels, full. Gall bladder distended with a thick yellowish-green bile, of the consistence of mortar. Common duct patent throughout.

Spleen. A little larger than normal, very dark violet hue externally, and variously mottled, by purpuric looking spots; soft and friable in substance. Upon section it retained the mottled, aspect, in many places of a brownish hue, in others bright red.

Kidneys. Venous system of the cortical part engorged, and malpighian tufts very distinct. Microscopic examination of liver and kidneys elicited no important facts.

Pelvic Viscera. Normal.

Alimentary Canal.—Tonsils enlarged; studded upon the surface with prominent follicles.

Pharynx and *Hard Palate* had a thin layer of exudation about them, mixed with, here and there, an apthous spot, without ulceration. The œsophagus tinged with biliary pigment.

Stomach.—Less altered than the symptoms during life would have led me to suppose. The mucous membrane covered with a remarkably tenacious layer of mucus, which water, poured upon the surface, failed entirely to detach. There were islets of racemose and punctiform redness, particularly about the front aspect, near the pylorus. The venous system full, prominent vessels being seen aggregated in spots. The membrane itself was much softer than normal about the cardiac end, (post-mortem digestion), and less so along the lesser curvature and the pyloric extremity, (not the result of a post-mortem digestion).

Duodenum.—Its perpendicular and transverse portions very red and highly injected. The mucous membrane and submucous tissue, succulent, softened, and tinged with bile and blood. Brunner's glands prominent, but no ulceration nor disease of them. Jejunum red and injected in various places throughout its extent, without any follicular or glandular disease.

Lower 3rd Ilium.—Much injected. Mucous membrane softer than normal. The solitary and agminate glands were well marked, but not unduly prominent; free of any morbid deposit, and showing no appearance whatever of ulceration.

Cæcum.—Mucous membrane injected in the same way. Towards the colon, follicular disease was evident; this extended as far as the rectum. The solitary glands, raised and prominent, almost vesicular in character from infiltration into them of a semi-opaline deposit. These bodies studded the surface of the membrane, and though of very small size, were plainly seen by looking at the light through the intestine; the vascularity in their neighbourhood great; in short, the larger bowel presented the appearances witnessed in the earliest stages of follicular dysentery.

Mesenteric Glands were larger than normal, succulent, and of bluish aspect.

Abstract of Symptoms presented in a non-fatal Case of the ordinarily severe Type.

Gr. J. O.—Ætat 26; admitted, 3rd July, 1860; had been in the Mediterranean three years; generally enjoyed good health; of sober habits; drinks

some wine and smokes daily. About two years ago he contracted a syphilitic ulcer, and symptoms of constitutional syphilis appeared within six months. From that time to the present, his health has been good. Illness commenced with dyspeptic symptoms, flatulence after eating, irregular bowels, feeling of weakness and depression of spirits. Last night he had a good deal of shivering, after which some heat of skin and headache set in, followed, towards morning, by sweating. On admission his face was rather flushed; he had pain in the eyeballs, which were tender to the touch; much frontal headache; skin, hot and dry; pulse, 100, large, soft, and jerky; respiration, 22, at times sighing in character; tongue, large, moist, with a thin white fur upon the dorsum; edges and tip, red. *Abdomen.* Splenic volume, somewhat increased; hepatic dulness, slightly so; tenderness over epigastrium, and from this to the umbilicus; margin of liver rather painful upon pressure; no abdominal tenderness elsewhere; belly, prominent from tympanitis, but not tub shaped; breath, somewhat fœtid; suffers from heartburn and acidity; no exanthem to be found. Has vomited once this morning, and hawked up mucus from back of pharynx. Upon the following day he appeared better, but had passed a restless night. Less pyrexia. Bowels had been freely acted on by medicine He was treated with quinine, and liq. ammonia acetatis. Upon fourth day, his symptoms were the same, but the evening exacerbations became more marked, the conjunctivæ were slightly tinged with bile, and there was biliary matter in the urine, to nitric acid test. The specific gravity of the urine was 1025, acid, non-albuminous, and depositing much urate of ammonia and a few oxalates. About the middle of the second week he appeared much improved; hardly any morning fever present, but still sweating at night. Quinine, which had been discontinued, was recommenced, but he vomited it. There was still perfect anorexia and great depression of spirits. Upon seventeenth day, he said he was much better, but without appetite. Upon the twentieth, there was a relapse; the organs of primary assimilation became deranged, but the slight jaundice, which disappeared upon the tenth day, had not reappeared.

In this way he went on—sometimes better, sometimes worse—up to the end of the fifth week, when he appeared convalescent, but very weak.

The course of this man's disorder was so irregular and variable as to preclude its accurate description. He never seemed, however, to be dangerously ill. His stomach was so irritable that everything appeared to disagree with him, and the least indiscretion in diet immediately affected his state.

After recovery his face had a bronzed aspect, and there were spots of pigmental deposit wherever blisters or sinapisms had been applied. The inguinal glands were also somewhat enlarged and tender, but not apparently inflamed. Subsequently, he had an attack of sciatica, which lasted for six or seven days. He afterwards had an attack, though slight, of intercostal neuralgia, with distressing palpitation. More than three months elapsed before he perfectly regained his appearance and strength.

A mild Case of Gastric Remittent Fever.

A medical officer, aged 28, who had always enjoyed pretty good health up to the summer of 1860, began at that season to suffer from symptoms of—what he conceived to be—dyspepsia.

He could not be certain of the date of his first feeling unwell, as his disease had commenced very insidiously, and as slowly and gradually increased.

There was not present any marked pyrexia, but he felt hot, restless, and uncomfortable at night, and toward morning he perspired. Sleep was disturbed by dreams and failed to refresh. Four or five times during his illness he had slight shivering, at uncertain intervals. The bowels were irregular, confined rather than otherwise, but sometimes the reverse; the stools were occasionally scybalous and unhealthy. There was irregular appetite, at times approaching perfect anorexia. All food, save the very plainest, was apt to disagree with him. The tongue was furred, though slightly so. The pulse, soft and weak, ranged between 70 and 90, generally quicker towards evening. There was some uneasiness, nausea, and flatulence after eating, and the epigastric region was tender to pressure. The edge of the liver was also slightly tender. The urine was sometimes thick and high coloured; at others, pale, copious, and of low specific gravity. He was never confined to bed, and his state varied much from day to day; but his spirits throughout were very depressed.

and everything "bored" him. There was, moreover, a constant sense of languor and weariness.

Thinking that these symptoms were only to be overcome by opposition to them, he took a good deal of exercise and endeavoured to forget his sensations but without much avail. For three or four days he was confined to his quarters from a mild attack of tonsillitis. From possessing a cool head and the steadiest of hands he began to feel very nervous, irritable, and tremulous under emotion.

He tried various medicines without benefit ; but fancied that an occasional dose of calomel and soda afforded him relief, and that, toward the later stages, the citrate of quinine and iron with strychnia were useful. Claret seemed by far the most agreeable drink, indeed, it was the only wine which seemed harmless.

This state of things lasted over some weeks. Gradually he got better, but long continued sallow and anœmic looking. One day, after apparent recovery, he felt an uneasiness in his right leg, and the structures about the ankle were tender ; subsequently he had stiffness and pain in the left leg and right shoulder, muscular movement being attended with some pain. These symptoms varied in degree and with the state of the weather—although they were never severe—until they gradually passed off.

I have every reason to believe that the above account is accurate and exact. Certainly—for the patient was myself—the description reads anything but an exaggerated one of what I felt at the time.

ARMY MEDICAL SCHOOL.

The fourth session of the Army Medical School commenced on the 1st of April, 1862, and terminated on the 31st of July. Seven Surgeons and Assistant Surgeons, and nineteen candidates attended the course. It is satisfactory to be able to report most favourably of the conduct and attention of all these gentlemen, with one exception.

The examination of the candidates in August was conducted in the usual way.

Military Medicine.

Written Examination (3 *hours*).

1. Describe suppurative Inflammation of the Liver ; (*a*) anatomically, including a description of the modes and points of outlet of the pus ; (*b*) the etiology of the disease ; (*c*) symptoms, general and special ; (*d*) diagnosis ; (*e*) outline of treatment.

2. Give a definition of Typhus fever, with (*a*) a description of the enteric form ; (*b*) the circumstances under which it arises in armies ; (*c*) the nature of the measures to be adopted to prevent such an outbreak, and to restrain its propagation.

3. Give the best account you can, judging from your observations in the medical wards of Fort Pitt Hospital, of the prevailing diseases of the British Army, distinguishing those arising in the course of (*a*) Home, and (*b*) of Tropical service, with any suggestions as to the causes in operation, and best means of preventing those in class (*a*).

The practical examination was conducted in the same manner as described in the reports of previous sessions.

Military Surgery.

Written Examination (3 *hours*).

1. Classify concisely the varieties of Gun-shot injuries of the Bones and Articulations of the Lower Extremity, from the Hip-joint downwards, according to their more important distinctions resulting from situation, kind of injury,

and neighbouring complications. Specify the treatment of each variety, confining yourself to the question of amputation, resection, or conservation, and state briefly your reasons for the treatment named. It is to be understood that you have only the resources ordinarily available in field practice.

(The reply to this question may be arranged in a tabular form, if preferred.)

2. Describe the method of examining a Recruit ordered in the Medical Regulations, and name the chief points to which your attention must be directed in performing this duty.

3. Describe the causes, both predisposing and direct, with their probable modes of action, and the characteristic symptoms of Hospital Gangrene.

The practical examination was conducted in the same manner as described in the reports of previous sessions.

Military Hygiene.

Written Examination (3 *hours*).

1. What are the chief reasons which have been brought forward in support of the view that malarious fever, typhoid fever, and cholera may occasionally be propagated by the water used as drink? How would you examine for organic matter in water, and how would you endeavour to remove it?

2. What are the physiological effects of exercise? How much exertion can a man be called upon to undertake in a day, without injury to his health? What are the results of excessive exertion? What measures of previous training, diet, and regulated intervals of rest, &c., would you recommend for men who were about to be called on to undergo sustained exertion for a long period; as, for instance, in a campaign?

3. What are the several modes of determining the dew point? Calculate the dew point, elastic tension, and weight of vapour in a cubic foot, when the dry bulb is 53°, and the wet bulb is 49° 5.

4. What are the principles of Hospital construction?

5. State in general terms what has been the amount of sickness and mortality among the Troops serving in the West Indies in former years, and at present. What have been the principal causes of mortality, and what should be the chief points to be attended to in the prevention of Malarious Disease, Yellow Fever, and Dysentery?

Practical Examination.

Chemical examination of water, lime-juice, milk, and beer.

Microscopic examination of adulterated flour and coffee (one specimen each).

Pathology and Morbid Anatomy.

Written Examination (3 *hours*).

1. Name, describe briefly the form, and indicate the site or distribution of the minute glands which compose or are found in the mucous membrane of the alimentary canal.

2. Describe the anatomical signs of true Dysentery seen after death; mention the circumstances under which the typical signs or forms of dysentery are liable to be modified or changed, and the lesions complicated or rendered more dangerous to life.

3. Describe the anatomical signs of Enteric or Intestinal Fever (Typhoid Fever) as seen after death; describe the various conditions in which the lesions of the small intestines may be found; and state the probable modes by which the morbid growth or deposit in and about the glands is eliminated.

4. Enumerate the circumstances under which death may ensue in cases of Enteric Fever (Typhoid).

5. During what state of the intestinal lesions may perforation of the gut, or peritonitis, be most likely to happen in cases of Enteric Fever?

6. State the age at which cases of Enteric Fever are most frequent.

Practical Examination.

1. Examine microscopically and report upon a specimen of diseased kidney, and of diseased liver.

2. Describe the lesions seen in two examples of diseased intestines.

3. Determine the magnifying power of a lens.

The names of the Surgeons and Assistant Surgeons attending the School, were—

Dr. Fyffe.
Mr. Tothill.
Mr. Chapple.
Mr. Teevan.
Mr. Harman.
Mr. Abbott.
Mr. Atkinson.

Seventeen of the candidates were gazetted on the 21st of November, 1862, the commissions being antedated to the 31st of March, 1862, and in one instance to 13th February, 1855, namely Dr. E. Becher, who had been an Acting Assistant Surgeon continuously from that date.

Names of Candidates, in the order in which they were Gazetted :—

1. Emil Becher, M.D.
2. John Ross Murray, M.D.
3. Thomas Parker Smith, M.B.
4. John Duston.
5. John Elliott.
6. Acheson George Bartley, M.D.
7. Henry Frank Hensman.
8. William James Tyrrell.
9. John Barlow Hannah, M.D.
10. William Pile, M.B.
11. Thomas Cecil Morgan.
12. Richard Patrick Ferguson.
13. Thomas Dodd Milburn.
14. Alexander Ferrier Churchill, M.D.
15. John Stannard M'Adam.
16. Edward Nicholson.
17. Richard Jones Owen, M.D.

The remaining Candidates, viz. Messrs. W. N. Duggan and R. W. Hooper, volunteered for service on the West Coast of Africa.

CIRCULARS, GENERAL ORDERS, MEMORANDA, &c.,

HAVING REFERENCE TO THE ARMY MEDICAL DEPARTMENT, ISSUED DURING 1861.

Circular Memorandum.

Army Medical Department, 7th February, 1861.

The Return of Deaths, &c., on Form 197 B, furnished to the War Office, in accordance with War Office Circular, No. 605, is invariably to be sent to this Office, with the Annual Return of Sick of each corps.

J. B. GIBSON, Director-General.

The Principal Medical Officer at :—

British Columbia.
China.
Bombay.
Madras.
Bengal.
New Zealand.
Gambia.
Cape Coast Castle.
Sierra Leone.
Western Australia.
New South Wales.
Ionian Islands.
Ceylon.
Mauritius.
St. Helena.
Cape of Good Hope.
Canada.
Halifax.
Bermudas.
Bahamas.
Honduras.
Jamaica.
Barbadoes.
Malta.
Gibraltar.

Sanitary, Circular.

Army Medical Department, 11th Feb., 1861.

Sir,—The Secretary of State for War having intimated that the "Scale of Victualling for Troops from England to India" will be hereafter substituted for the Admiralty Scale, on board all vessels that may be engaged by the Government for the conveyance of troops, also in Her Majesty's troop ships, I have the honour to notify the same for your information.

I have, &c.,

(Signed) J. B. GIBSON, Director-General.

The Principal Medical Officer, &c.

Medical.

Memorandum.

The Director-General begs to make known to the Assistant Surgeons of Her Majesty's Army, that the examination they are required to pass before they can be promoted to the rank of Surgeon, in accordance with the Royal Warrant of the 1st October, 1858, will, except in special cases, take place once a year only.*

Those Assistant Surgeons who defer their examination, must distinctly understand that they will be passed over, and will not, when eventually promoted, regain their position, should the requirements of the service render the advancement of their juniors (who have been found qualified) necessary.

All applications from Assistant Surgeons who have completed five years full pay service, and are desirous of being examined, must be sent to the Director-General on or before the 31st of December each year, as the papers will be prepared and distributed about the 1st of April following.

Army Medical Department, 22nd February, 1861.

E. H. Circular Memorandum.

(Addressed to General and other Officers commanding Districts and Stations at Home and Abroad.)

General No. 111. Horse Guards, S.W., 2nd March, 1861.

Staff Clerks.
1—(1861).

His Royal Highness the General Commanding-in-Chief hereby notifies that the Secretary of State for War has consented to the admission into Military Hospitals of Pensioners employed as Clerks in the District Military Offices, whenever Hospital accommodation can be made available for them without prejudice to the Service, and in cases where the Senior Medical Officer at the Station or District may deem it necessary. They will, however, be placed under the usual Hospital Stoppages during the periods of their being under treatment in Hospital.

By Command,
James Yorke Scarlett, Adjutant-General.

E. H. Circular Memorandum.

(Addressed to the Army at Home and Abroad.)

General No. 119. Horse Guards, S.W., 18th March, 1861.

Instruction of Musketry.
2—(1861.)

A reduction in the number of Assistant Surgeons of regiments having been determined on, the General Commanding-in-Chief desires that the attendance at ball practice of Medical Officers attached to regiments and depôt battalions may, after such reduction, be dispensed with at all stations at home and abroad, except the East and West Indies, Ceylon, and China; and as the Secretary of State for War has sanctioned an increase of Staff Assistant Surgeons for duty at rifle practice at

Gibraltar,	Portsmouth,
Malta,	Plymouth,
Aldershot,	Dublin,
Shorncliffe,	and
Dover,	The Curragh,

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* The examination papers for Assistant Surgeons serving in India will be forwarded from this Office in October, and for those serving at other Foreign Stations and at Home in April of each year.

Such number only of the Senior Assistant Surgeons can be examined as will suffice to keep up the passed list to 50.

The Topographical or Medico-statistical Reports required by the Regulations to be transmitted by Medical Officers with their answers, must be Original Reports specially written for this purpose. Copies of, or extracts from, Annual Reports will not be accepted.

These examinations are to be conducted by Principal Medical Officers of Districts or Stations, in accordance with the instructions contained in the Medical Regulations, p. 244.

His Royal Highness the Duke of Cambridge further desires, that General Officers Commanding will take care that Staff Assistant Surgeons only are employed on this duty, as soon as the additional Officers of that rank arrive at the respective stations.

By Command,
JAMES YORKE SCARLETT, Adjutant-General.

E. H. General Order. No. 782.
Horse Guards, S.W., 25th March, 1861.

Rank.
1—(1861).

The General Commanding-in-Chief desires that paragraph 1, page 5, and paragraph 28, page 34, of the Queen's Regulations and Orders for the Army (Edition 1859), may be altered as follows, viz. :—

Staff Officers of regiments, and Officers of the Civil Departments attached to the Army, are, in regard to choice of quarters, to be classed with the several ranks specified below ; but this is not to give Regimental Staff Officers, nor Officers of the Civil Departments, any claim to military command, nor to salutes from ships of war, forts, or guards.

All guards and sentinels are to pay the same compliments to the Officers of the Royal Navy and Marines, when in uniform, as are directed to be paid to Officers of the Army ; *sentinels, only*, will pay similar honours to Officers of the Civil Departments attached to the Army, according to their relative ranks.

By Command of His Royal Highness the General Commanding-in-Chief,
JAMES YORKE SCARLETT, Adjutant-General.

Circular No. 672.

Home and Foreign.

7609
242

Victoria R.,

Whereas it has been represented to Us that it is expedient to amend that part of the 16th Clause of Our Royal Warrant of the 1st October, 1858, which assigns to Staff or Regimental Surgeons the relative rank of Major, according to the date of their Commissions ; Our will and pleasure is, that Staff or Regimental Assistant Surgeons, who may be promoted to the rank of Staff or Regimental Surgeon on or after the date of this Our Royal Warrant, shall rank as Majors, but juniors of that rank ;* and that Staff or Regimental Surgeons, who were commissioned as such before the date hereof, shall continue to rank as Majors according to the date of their Commissions.

Given at Our Court of St. James's, this 28th day of March, 1861, in the twenty-fourth year of Our reign.

By Her Majesty's Command,
HERBERT.

Circular No. 682.

12598
10

Victoria R.,

Whereas it has been found expedient to revise the regulations under which an allowance is granted for the hire and maintenance of black male servants to Officers of the General, Garrison, and Departmental Staff, and to Regimental Officers of Our Army, serving at stations within the tropics : It is Our Will and Pleasure, that instead of the provisions contained in pages 61, 62, and 63, of Our Royal Warrant of the 1st July, 1848, which are hereby cancelled, those contained in this Our Royal Warrant, to be administered and interpreted by our Secretary of State for War, shall, from the date hereof, be adopted.

23rd April, 1861.

1. The number of black male personal servants and grooms for the hire and maintenance of whom Officers on certain stations within the tropics are entitled to an allowance from Government, shall be regulated as follows :—

* Cancelled by Royal Warrant (Circular 808), dated March 7th, 1863.

Class.	Rank.	Maximum Number of		
		Personal Servants.	Grooms.	Total.
	General Garrison and Departmental Staff.			
1	General, and Officers ranking as such	3	4	7
2	Lieutenant-General ,, ,, ...	3	3	6
3	Major-General ,, ,, ...	2	3	5
4	Brigadier-General ,, ,, ...	2	2	4
5	Colonel ,, ,, ...	2	2	4
6	Lieutenant-Colonel ,, ,, ...	1	1	2
7	Major ,, ,, ...	1	1	2
8	Captain ,, ,, ...	1	1	2
9	Lieutenant ,, ,, ...	1	..	1
10	Ensign ,, ,, ...	1	..	1
	Regimental Officers.			
	Field Officer	1	1	2
	Captain	1	..	1
	Subaltern	1	..	1
	Instructor of Musketry	1	1	2
	Paymaster	1	..	1
	Adjutant	1	1	2
	Surgeon-Major, or Surgeon	1	1	2
	Assistant-Surgeon	1	..	1
	Quartermaster	1	1	2

2. Although the number of grooms specified above has been fixed with reference to the maximum number of horses for which each class or rank of Officer may draw forage, the issue of the commuted allowance, in lieu of grooms, is to be regulated by the number of horses actually and necessarily kept for the performance of the Officer's public duty, according to the following scale:—

One groom for one or two horses.
Two grooms for three or four horses.
Three grooms for five or six horses.
Four grooms for seven or eight horses.

If the duties of an Officer, for whom no provision is made for a groom, require him to keep a horse, and entitle him to forage at the public expense, such Officer may draw the allowance for a groom in addition to that for his personal servant. But in every such case, reference should be given on the pay list to the authority under which forage is drawn.

3. Officers having Brevet rank are not entitled to draw this allowance according to the Brevet rank, unless they be in the actual discharge of higher duties than those which attach to their Regimental or Staff commissions, nor unless those duties have been performed for a period exceeding one month.

4. If, in consequence of the death or temporary absence of an Officer from the station, an inferior Officer succeed to the duties of a superior commission or appointment, he shall, on making the declaration prescribed by Article 6, be permitted to draw the allowance for the number of black male personal servants and grooms allotted to the superior commission or appointment, whilst he continues to execute its duties, provided the period shall exceed one month, and provided also that the Officer thus acting be in the next degree of rank or situation to the dead or absent Officer, as, if he be more than one degree below that rank or situation, he shall draw the allowance only according to the rank or situation next above his own.

5. The rate of allowance for each black male servant in the Windward and Leeward Island Command, in Jamaica, and at Honduras, shall be 1*s.* 6*d.*, and at the stations on the Western Coast of Africa, 1*s.* a day.

6. The object of this allowance being to prevent the employment of European soldiers in hot climates upon any duties not strictly military, Officers commanding corps will accordingly be held responsible that European soldiers be not employed in any way as servants; and every Officer drawing the said allow-

ance for one personal servant and no groom, will sign the declaration in support of his claim, according to Form No. 1, annexed hereto. Those drawing it for more than one servant or groom will be required to furnish a declaration, according to Form No. 2.

Rations of provisions are not to be issued from the public stores to the black male servants of Officers unless their masters be employed in the field against an enemy; and while rations are so issued, the value thereof, as fixed by the Officer commanding on the station, shall be deducted from the allowance granted by this regulation.

7. This allowance shall not be granted to Officers of corps composed wholly of black soldiers, or partly of black soldiers and partly of Europeans, whether the Officers be employed on the Staff or not, provided any black soldiers of their corps be present on the same station; and no Officer in a corps composed wholly or in part of black soldiers, shall be permitted to employ an European soldier as a servant.

Given at Our Court at St. James's, this 23rd day of April, 1861, in the twenty-fourth year of Our reign. By Her Majesty's Command,

HERBERT.

Form of Declaration, No. 1.

I hereby declare, upon honour, that I have not had attending me, in the capacity of a servant, during any part of the period for which I now claim servants' allowance, any soldier or labourer, or any other person employed and paid by the public, and that no ration of provisions has been drawn for the servant for whom the allowance is claimed.

Name_____

Rank_____

Dated at _____ this _____ day of _____ 186____.

Form of Declaration, No. 2.

I hereby declare, upon honour, that I have employed the number of personal servants and grooms for whom I claim the allowance above specified, and that no rations have been drawn for them; nor have I had attending me, in the capacity of a servant or groom, during any part of the time, any soldier or labourer, or any other person employed and paid by the public, and I further declare that I have kept for the performance of my public duties the number of horses specified, and have drawn forage for them at the public expense, under the authority of [*To be quoted*].

Name_____

Rank_____

Dated at _____ this _____ day of _____ 186___,

In the case of Officers who are allowed to employ soldiers for the care of their horses, the following addition is to be made to declaration No. 2, viz.:—"Except [*here insert the number*] soldier or soldiers, employed by me for the care of my horse or horses (as the case may be), and for whom a corresponding deduction has been made from the number of grooms, for whom I should otherwise have been entitled to receive the pecuniary allowance."

Circular No. 683. Home and Foreign.

6911
298

War Office, 20th May, 1861.

Sir,—With reference to Section XVI., page 59, of the Medical Regulations of the 7th of October, 1859, prescribing a more liberal and much more varied class of diets for use in Military Hospitals, I am directed by the Secretary of State for War to inform you, with a view to remove a misunderstanding which appears to exist regarding the extent to which extras may be given with any of the diets in the scale, that it was in no way intended, by the concluding paragraph of Article 2 of the said Section, to sanction the issue of *extra articles of food* to patients in hospital, in addition to the diet prescribed by the Surgeon, as will appear obvious on referring to the Diet Forms printed at pages 222–225 of the Regulations before mentioned.

The new Scale of Dietary, with its varied Tables, containing different amounts of nourishment to meet the various requirements of the sick, was expressly designed to meet every ordinary case, without having recourse to additions or extras, and previous to its adoption underwent very careful consideration, and was approved by leading authorities in such matters, as not only containing considerable variety, but affording ample and sufficient nourishment for every ordinary requirement; and I am, therefore, to request that the administration of extras to patients on diet may in future be confined to Wines, Spirits, and Malt Liquors, and to add that, although no restriction is, or can be, laid down by regulation, as to the quantity to be given of such articles, Lord Herbert expects that prescribing Surgeons will order no more than the state of their patients really requires, and that every economy compatible with the thorough well-being of the sick will be observed. Every case to which such extras are prescribed must be entered by the Surgeon in the Medical Case Book, and the amount of extras daily ordered, as well as the reasons for giving the same, also duly recorded therein, so that the Inspecting Medical Officer may be enabled to satisfy himself as to the propriety and actual necessities of the issues.

In cases of emergency, or when men on admission into Hospitals require nourishment before their names can be entered in the Diet Roll, or diets can be prepared for them, Medical Officers may order such articles as they deem necessary from the reserve store kept by the Nurse or Assistant Wardmaster in General Hospitals, and by the Assistant Steward in Regimental Hospitals; but it is to be understood that these orders are to be confined to the articles specified in the margin,* and enumerated in the form of Daily Abstract; and when extras of this description are ordered, they are to be duly entered in the Case Book, as well as on the Diet Sheets, and the cause of emergency, &c., fully recorded in the former.

I am also to request that, when Medical Officers find it necessary, under Article 65 of the Purveyor's Regulations of 1st January, 1861, to prescribe Medical Comforts to Sick Women and Children, the issues may be confined to the articles above specified, and that each of the cases in question may be duly entered in a Medical Case Book, in the manner already directed for patients in Hospital receiving extras.

I have the honour to be, Sir, your obedient servant,

B. Hawes.

To Officers Commanding, Military Medical Officers, and Purveyors.

Medical. Circular Memorandum.

Army Medical Department, 25th May, 1861.

Several instances having recently occurred of soldiers being sent out to join their regiments abroad, who were obliged to be invalided to England immediately on their arrival, on account of disabilities which there is every reason to suppose existed prior to their leaving this country, the Director-General begs to draw the attention of Medical Officers to this subject, and to request that a most minute examination of every soldier ordered on foreign service may be made on the day, or the day prior to his embarkation; and that this duty be performed by the Senior Medical Officer of the Battalion to which the soldier belongs.

E.H. General Order. No. 791.

Horse Guards, S.W., 1st July, 1861.

Medical.
1—1861.

Much inconvenience having arisen from Medical Officers of Districts and Regiments making reports to the heads of their department, without placing the military officers in immediate command in possession of these reports, his Royal Highness the General Commanding-in-Chief, with the concurrence of the Secretary of State for War, is pleased to direct that, whenever Medical Officers conceive themselves called on to make reports upon, or to offer suggestions concerning matters affecting the health of the troops, and sanitary

* Arrow-root, sago, tea, sugar, bread, essence of beef, spirits, and wine.

condition of the locality in which they are stationed, to the head of the Medical Department, they shall furnish duplicates to the officer in immediate command.

By order of his Royal Highness, the General Commanding-in-Chief.

JAMES YORKE SCARLETT, Adjutant-General.

Recruiting Department.

Circular Memorandum.

(Addressed to the Army at Home and Recruiting Districts.)

General No. 143. Horse Guards, S.W., 3rd July, 1861.

His Royal Highness the General Commanding-in-Chief having reason to believe that men unfit for the service, from physical defects, have been passed into it, desires Inspecting Field Officers of Recruiting Districts, and Officers Commanding Regiments and Depôts, to call the attention of the Medical Officers under their orders to the 99th page of the Hospital Regulations, and that of Civil Medical Practitioners to the Instructions lately issued to them.

If due attention were paid to these Instructions, the numerous cases of men discharged after very short service would be materially diminished.

By Command,

J. YORKE SCARLETT, Adjutant-General.

E.H. Circular Memorandum.

(Addressed to the Army at Home and Abroad.)

General No. 158. Horse Guards, S.W., 14th September, 1861.

Soldiers' Wives. 1—(1861).

With reference to Article 65, of the Regulations for Purveyors, dated 1st January, 1861, by which Medical Officers are permitted to draw upon the Purveyor for Medical Comforts, when deemed absolutely necessary for the wives and children of soldiers married with leave, under a certificate from the Officer Commanding, the Secretary of State for War has, at the instigation of his Royal Highness the General Commanding-in-Chief, been pleased so far to relax the order for obtaining the Commanding Officer's certificate before issue, as in cases of great urgency, where delay would be injurious to the patient, to permit the issue to be made on the certificate of the Medical Officer that the case requires immediate attention, and with the understanding that the requisition will be backed by the Commanding Officer as soon after as possible. His Royal Highness therefore requests that Commanding Officers will be most particular in their inquiries as to the necessity of the issue before their signature is obtained, as any abuse of this boon to the soldiers' family will inevitably deprive them of its continuance.

By Command,

JAMES YORKE SCARLETT, Adjutant-General.

Sanitary. Department Circular.

A revision of the War Office Circular No. 683, 20th May, 1861, having met with the approval of the Minister for War, the Director-General takes the opportunity thereon to express to Medical Officers his opinion that the addition to the extra articles now made in the revised Circular will be sufficient, with the hospital diets themselves, to meet every case of disease among soldiers, if judiciously used.

He wishes, also, to point out that the condition to be understood by the words "cases of emergency," in the above circular, is intended to apply to every one of sickness which urgently requires the administration of more concentrated nournishment than is contained in the Scale of Diets specified at page 60 of the Medical Regulations.

The Director-General has observed in several instances the employment of jelly by Medical Officers in cases represented as emergently demanding nutriment, and he would point out to them the circumstance, established by chemical authority, that the tissues from which this article is obtained do not possess the elements adapted for the support of the vital process so desirable

under emergent circumstances of disease; a consideration which strongly suggests the employment of concentrated beef-tea in all such cases.

Army Medical Department, 6, Whitehall Yard,
16th September, 1861.

Circular No. 713.
6911
341

Home and Foreign.

War Office, 26th September, 1861.

Sir,—With reference to War Office Circular 683, of the 20th May last, I am directed to acquaint you that, with a view to provide for cases of sickness urgently requiring the administration, at short intervals, of more concentrated nourishment than is attainable by the scale of daily diets laid down at page 60 of the Medical Regulations of the 7th October, 1859, the Secretary of State for War has been pleased, on the recommendation of the Director-General of the Army Medical Department, to approve of the addition of the articles named in the margin* to the list of extras embodied in the Circular in question, and to sanction their issue in emergent cases of disease, when deemed advisable and necessary by Medical Officers.

It is to be understood, however, that these additional articles are only to be drawn as wanted. Medical Officers will, therefore, when the necessity arises, send special requisitions to the Purveyor and enter, immediately thereafter, the supplies so demanded against the patients' names on the Diet Sheets (War Office, Form 1145).

I am at the same time to state for the guidance of Purveyors that when beef-tea is prescribed it is to be prepared from fresh meat, whenever practicable, and that the essence of beef or preserved "meat juice" of the Reserve Store is only to be used when fresh meat cannot at the time be procured.

I am, Sir, your obedient servant,
B. Hawes.

To Officers Commanding, Military Medical Officers,
and Purveyors.

E.H.

Circular Memorandum.

(Addressed to the Army at Home and Abroad.)

General Number 167. Horse Guards, S.W., 28th November, 1861.

Funeral Honours.
1—(1861).

His Royal Highness the General Commanding-in-Chief directs that the same Funeral Honours shall be paid to Military Medical Officers who may die whilst attached to and serving with troops, to which combatant Officers of the same relative rank are entitled.

By Command,
James Yorke Scarlett, Adjutant-General.

Circular No. 714.
30
Hospital Corps.
500

War Office, 28th September, 1861.

Sir,—I am directed to transmit herewith, for your information and guidance, a copy of a Report on the Organization of the Army Hospital Corps, &c., and to acquaint you that the recommendations of the Committee have been approved by the Secretary of State for War, in concert with his Royal Highness the General Commanding-in-Chief.

I have the honour to be, Sir, your obedient servant,
Edward Lugard.

To General and other Officers Commanding,
Military Medical Officers, and Purveyors.

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* Milk, eggs, oranges, or other inexpensive fruit.

NOMINAL ROLL OF MEDICAL OFFICERS SERVING ON FULL PAY.*

DIRECTOR-GENERAL.

JAMES BROWN GIBSON, M.D., C.B., Honorary Physician to the Queen (7th March 1860).

INSPECTORS-GENERAL OF HOSPITALS.

NAME.	Date of Commission.	Date of Entry into the Service.	Station.
William Linton, M.D., C.B., Honorary Physician to the Queen.	1 Oct. 1858	12 Dec. 1826	Bengal.
John Robert Taylor, C.B., Honorary Surgeon to the Queen.	31 Dec. 1858	31 May 1833	Aldershot.
Thomas Galbraith Logan, M.D., Honorary Physician to the Queen.	8 April 1859	8 May 1828	London.
James Edmund Williams ..	4 May 1860	11 May 1827	Dublin.
Wm. Mure Muir, M.D., C.B.	15 Feb. 1861	22 Nov. 1842	Canada.
Thomas David Hume, M.D.	31 Dec. 1861	26 Oct. 1826	Malta.
Arthur Anderson, M.D. ,,	28 Jan. 1862	16 Oct. 1835	Netley.

DEPUTY INSPECTORS-GENERAL OF HOSPITALS.

NAME.	Date of Commission.	Date of Entry into the Service.	Station.
Robert Lawson	8 Dec. 1854	15 May 1835	Cape of Good Hope.
Samuel Maitland Hadaway	25 Jan. 1856	22 Nov. 1827	Devonport.
Arch. Gordon, M.D., C.B..	25 Jan. 1856	27 June 1836	Mauritius.
℣.℄. James Mouat, C.B.	1 Oct. 1858	14 Dec. 1838	New Zealand.
Thos. Ross Jameson, M.D.	31 Dec. 1858	10 Jan. 1834	Portsmouth
John Drope McIllree.. ..	31 Dec. 1858	20 Feb. 1835	Nova Scotia.
Geo. Stewart Beatson, M.D.	31 Dec. 1858	13 July 1838	Madras.
George Taylor, M.D... ..	31 Dec. 1858	16 May 1834	Canada.
Joshua Paynter	31 Dec. 1858	11 Jan. 1839	Gibraltar.
Patrick Gammie..	31 Dec. 1858	17 June 1836	Bombay.
Richard Dane, M.D.	31 Dec. 1858	17 July 1835	Ceylon.
Fras. Wm. Innes, M.D., C.B.	31 Dec. 1858	10 Peb. 1837	Corfu.
John Fraser, M.D., C.B. ..	31 Dec. 1858	20 Aug. 1841	Colchester.
John Harry Ker Innes, C.B.	31 Dec. 1858	8 April 1842	Cork.
Thomas Longmore, Prof. of Clin. and Mil. Surgery	31 Dec. 1858	3 Feb. 1843	Army Medical School, Netley.
Samuel Currie, M.D., C.B.	18 Jan. 1859	14 Oct. 1836	Edinburgh.
George Clerihew, M.D. ..	26 April 1859	2 Nov. 1842	Dublin.
Richard James O'Flaherty	19 July 1859	9 Jan. 1835	Jamaica.
Thos. Graham Balfour, M.D.	22 July 1859	29 April 1836	London.
Heury Mapleton, M.D. ..	26 Aug. 1859	12 July 1839	London.
Chas. A. Gordon, M.D., C.B.	11 May 1860	8 June 1841	Bengal.
William Rutherford, M.D.	15 Feb. 1860	21 July 1841	Woolwich.
Jos. S. Prendergast, M.D...	28 Jan. 1862	19 Feb. 1836	Bengal.
William Home, M.D... ..	28 Jan. 1862	12 Jan. 1838	Hong Kong.
James McGregor	28 Jan. 1862	6 Dec. 1839	West Indies.
John Bent	28 Jan. 1862	25 April 1838	Shorncliffe.
William Dick, M.D	17 Mar. 1863	13 May 1836	
Local Rank.			
Daniel Maclachlan, M.D...	23 Feb. 1849	14 Aug. 1827	Chelsea Hospital only.
William C. Maclean, M.D., Prof. Clin. and Mil. Med.	..	..	Army Medical School, Netley.

* Corrected to 31st of March, 1863.

SURGEONS-MAJOR,

Name.	Date of Commission.	Date of Entry into the Service.	Service.	Station.
James Guy Piers Moore	8 Dec. 1854	3 Mar. 1837	Staff	Cape of Good Hope.
John Gillespie Wood, M.D...	9 Feb. 1855	11 Jan. 1839	Staff	Nova Scotia.
Wm. Leslie Langley, M.D.	16 Feb. 1855	11 Jan. 1839	Staff	Malta.
Edward John Burton, M.D...	16 Feb. 1855	11 May 1838	Staff	Canada.
Henry Cooper Read	1 May 1855	31 May 1839	Staff	Dublin.
Richard Coffin Elliott	21 May 1855	7 June 1839	Staff	West Indies.
John Mure, M.D.	6 July 1855	4 Oct. 1839	Staff	Bermuda.
William Sall, M.D.	20 July 1855	10 May 1839	Staff	Melbourne.
Henry Downes, M.D.	7 Sept. 1855	1 Nov. 1839	Staff	Belfast.
John Ashton Bostock, M.D., Hon. Surgeon to the Queen.	20 Mar. 1857	8 Feb. 1842	Scots Fusilier Guards ..	London.
George Eleazar Blenkins	24 Jan. 1858	13 April 1838	Grenadier Guards.. ..	London.
Thomas Patrick Matthew	31 Aug. 1858	12 Dec. 1843	Staff	Malta.
John Grant	1 Oct. 1858	9 June 1837	Staff	Edinburgh.
James Stewart	1 Oct. 1858	17 April 1838	Staff	Cork.
Alex. Douglas Taylor, M.D...	1 Oct. 1858	15 Sept. 1837	Staff	Canada.
James Somerville Litle	1 Oct. 1858	2 Nov. 1836	Royal Artillery	Woolwich.
George Thomas Ferris	1 Oct. 1858	26 Sept. 1837	Royal Artillery	Woolwich.
Melborne Broke Gallwey	1 Oct. 1858	18 June 1838	Staff	Bengal.
Henry Franklin	1 Oct. 1858	29 Dec. 1837	Staff	Chatham.
Wm. Ord Mackenzie, M.D.	4 Jan. 1859	4 Jan. 1839	3rd Hussars	Dublin.
James Jopp, M.D.	22 Feb. 1859	22 Feb. 1839	36th Foot	Dublin.
Jas. Gordon Inglis, M.D., C.B.	29 Mar. 1859	29 Mar. 1839	64th Foot	Aldershot.
Thomas Rose Dyce	7 June 1859	7 June 1839	1st Battalion, 15th Foot ..	Canada.
Henry Jas. Schooles, M.D.	22 July 1859	28 June 1839	Staff	Winchester.
John Donald	23 Aug. 1859	23 Aug. 1839	Staff	Leeds..
Francis Charles Annesley	17 Sept. 1859	17 Sept. 1839	Royal Engineers	Gibraltar.
Jas. Walker Chambers, M.D.	4 Oct. 1859	4 Oct. 1839	35th Foot	Bengal.
Duncan Donald McCay McDonald	4 Oct. 1859	4 Oct. 1839	Staff	Dublin.

Geo. Murray Webster, M.D.	6 Dec. 1859	6 Oct. 1839	Staff	Aldershot.
James Alex. Fraser, M.D.	20 Dec. 1859	20 Dec. 1839	1st Battalion, 18th Foot	Madras.
Joseph Burke	10 Jan. 1860	10 Jan. 1840	1st Battalion, 3rd Foot	Aldershot.
Robert Carew Anderson, M.D.	22 May 1860	22 May 1840	13th Hussars	Aldershot.
William Henry Mackintosh, M.D.	22 May 1860	22 May 1840	2nd Battalion, 21st Foot	Dublin.
John Summers, M.D.	29 May 1860	29 May 1840	Royal Engineers	Chatham.
Charles R. Nicoll	26 June 1860	26 June 1840	1st Bat., Grenadier Guards	Canada.
John Burton St. Croix Crosse	9 Oct. 1860	9 Oct. 1840	11th Hussars	Cahir.
Richard George Davys Banon	30 Oct. 1860	30 Oct. 1840	Staff	London.
James McGrigor Grant, M.D.	6 Nov. 1860	6 Nov. 1840	84th Foot	Shorncliffe.
James Carroll Dempster, M.D.	29 Dec. 1860	29 Dec. 1840	Staff	Bengal.
Edward Scott Docker	29 Dec. 1860	29 Dec. 1840	Staff	Ceylon.
William Campbell Seaman, M.D.	16 Feb. 1861	16 Feb. 1841	72nd Foot	Bombay.
Henry Clinton Foss	26 Feb. 1861	26 Feb. 1841	1st Battalion, 2nd Foot	Aldershot.
George Williamson, M.D.	26 Mar. 1861	26 Mar. 1841	Staff	Portsmouth.
William Kilner Swettenham, M.D.	9 April 1861	9 April 1841	1st Battalion, 5th Foot	Aldershot.
William Arden	9 April 1861	9 April 1841	14th Hussars	Manchester.
Robert Bowen	18 May 1861	18 May 1841	1st Bat., Rifle Brigade	Canada.
Jas. John Marjoribanks Wardrop	21 May 1861	21 May 1841	2nd Bat., Grenadier Guards	London.
John Ewing	21 May 1861	21 May 1841	62nd Foot	Nova Scotia.
Thomas Waller Barrow	8 June 1861	8 June 1841	Staff	Canada.
Ludovic Charles Stewart	8 June 1861	8 June 1841	Staff	Glasgow.
Richard Gamble, M.D.	8 June 1861	8 June 1841	1st Battalion, 24th Foot	Aldershot.
Nesbitt Heffernan, M.B.	11 June 1861	11 June 1841	1st Battalion, 11th Foot	Cork.
Thomas Joliffe Tuffnell	11 June 1861	11 June 1841	Staff	Dublin.
Henry Briscoe, M.D.	28 Aug. 1861	28 Aug. 1841	Royal Artillery	Woolwich.
Augustus Purefoy Lockwood	17 Sept. 1861	17 Sept. 1841	2nd Dragoons	Edinburgh.
George Thomas Galbraith, M.D.	17 Sept. 1861	17 Sept. 1841	Staff	Portsmouth.
Cosmo Gordon Logie, M.D.	5 Oct. 1861	5 Oct. 1841	Royal Horse Guards	London.
Orlando Sawle Donnall	19 Oct. 1861	19 Oct. 1841	Staff	West Indies.
Edward Menzies	29 Oct. 1861	29 Oct. 1841	Staff	Bengal.
Ethelbert Henry Blake, M.D.	16 Nov. 1861	16 Nov. 1841	Royal Artillery	Woolwich.
James Richard Ffennell	20 Nov. 1861	20 Nov. 1841	2nd Battalion, 16th Foot	Canada.
James Macbeth, M.D.	3 Dec. 1861	3 Dec. 1841	74th Foot	Madras.
Richard Francis Valpy De Lisle	10 Dec. 1861	27 Aug. 1841	Royal Artillery	Ireland.

SURGEONS-MAJOR—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.	Station.
Thomas Goldie Scot, M.D.	14 Dec. 1861	14 Aug. 1841	79th Foot	Bengal.
John Elliot Carte, M.B.	31 Dec. 1861	31 Aug. 1841	2nd Battalion, 14th Foot	New Zealand.
Huntley George Gordon, M.D.	31 Dec. 1861	31 Dec. 1841	69th Foot	Birmah.
Thomas Guy, M.D.	28 Jan. 1862	28 Jan. 1842	Royal Artillery	Woolwich.
Robert M'Wharrie, M.D.	11 Mar. 1862	11 Mar. 1842	59th Foot	Dover.
Sandford McVittie Lloyd, M.D.	2 April 1862	5 Mar. 1841	Staff	Canada.
William Green Trousdell, M.D.	8 April 1862	8 April 1842	2nd Battalion, 13th Foot	Mauritius.
Patrick Sinclair Laing	8 April 1862	8 April 1842	2nd Battalion, 23rd Foot	Bengal.
Benjamin Swift, M.D.	8 April 1862	8 April 1842	96th Foot	Cape of Good Hope.
Charles Bush Hearn	15 April 1862	15 April 1842	1st Battalion, 1st Foot	Madras.
C.E. Joseph Jee, C.B.	15 April 1862	15 April 1842	78th Foot	Shorncliffe.
Thomas Best	22 April 1862	22 April 1842	68th Foot	Madras.
Edward Howard	29 April 1862	29 April 1842	1st Battalion, 20th Foot	Bengal.
Henry Lionel Cowen	17 June 1862	17 June 1842	Ceylon Rifles	Ceylon.
Miah W. Murphy	22 July 1862	22 July 1842	91st Foot	Madras.
Edward Moorhead, M.D.	2 Aug. 1862	2 Aug. 1842	29th Foot	Glasgow.
Francis Reid, M.D.	2 Aug. 1862	2 Aug. 1842	2nd Battalion, 5th Foot	Cape of Good Hope.
Hugh Crawford Walshe, M.D.	3 Sept. 1862	3 Sep. 1842	Royal Artillery	Bombay.
Benjamin William Marlow, M.D.	2 Dec. 1862	25 Oct. 1842	28th Foot	Bombay.
John Wyatt	9 Jan. 1863	20 May 1851	Coldstream Guards	London.
William Walter Weld	20 Jan. 1863	20 Jan. 1843	Staff	
Alexander Forteath, M.D.	10 Feb. 1863	10 Feb. 1843	1st Dragoons	Birmingham.

Name.	Date of Commission.	Date of Entry into the Service.	Service.	Station.
John William Mostyn, M.D.	16 Mar. 1849	8 Mar. 1844	Staff	Bristol.
Luke Barron, M.D.	25 Sept. 1849	10 July 1840	Staff	Chatham.
Alexander Barclay, M.D.	13 April 1852	22 Dec. 1843	43rd Foot	Bengal.
John Thomas Watson Bacot	3 Dec. 1852	10 May 1844	89th Foot	Bengal.
William Freeman Daniell, M.D.	11 Mar. 1853	26 Nov. 1847	Staff	Jamaica.
William Braybrooke	2 Sept. 1853	16 June 1843	Staff	London.
George Frederick Bone, M.D.	21 Oct. 1853	9 Dec. 1845	Royal Artillery	Woolwich.
Thomas Parr	21 Oct. 1853	21 July 1846	55th Foot	Portsmouth.
George Cunninghame Meikleham, M.D.	28 Mar. 1854	16 June 1843	70th Foot	New Zealand.
Robert Marshall Allen	28 Mar. 1854	30 June 1843	3rd Dragoon Guards	Bengal.
Vere Webb	28 Mar. 1854	13 Oct. 1843	Staff	Canada.
William Barrett, M.B.	28 Mar. 1854	20 Oct. 1843	Staff	Pembroke.
David Reid Mackinnon	28 Mar. 1854	12 Dec. 1843	Staff	Walmer.
Alfred Crocker	28 Mar. 1854	26 Jan. 1844	2nd Battalion, 3rd Foot	Gibraltar.
William Godfrey Watt	28 Mar. 1854	1 Mar. 1844	15th Hussars	Curragh.
George William Powell	28 Mar. 1854	20 Aug. 1844	Staff	Cape of Good Hope.
Hampden Hugh Massy, M.D.	28 Mar. 1854	22 Nov. 1844	2nd Dragoon Guards	Bengal.
George Augustus Frederick Shelton, M.B.	5 May 1854	3 Jan. 1845	48th Foot	Bengal.
Francis Oliver Barker, M.D.	5 May 1854	14 Feb. 1845	Staff	Bengal.
William George Swan, M.D.	21 July 1854	28 Feb. 1845	1st Battalion, 16th Foot	Canada.
Henry Huish, M.D.	15 Aug. 1854	31 Jan. 1845	5th Lancers	Norwich.
William Frederick Torcato Ivey	15 Aug. 1854	30 May 1845	Staff	Gibraltar.
Francis Hastings Baxter, M.D.	15 Aug. 1854	11 July 1845	12th Lancers	Aldershot.
John Mullins	6 Oct. 1854	13 Oct. 1843	St. Helena Regiment	St. Helena.
William Ker Park	6 Oct. 1854	31 Oct. 1845	16th Lancers	Sheffield.
Henry Kendall, M.D.	6 Oct. 1854	16 Dec. 1845	7th Hussars	Bengal.
George Saunders	20 Oct. 1854	16 Dec. 1845	Staff	Belfast.
Thomas Moorhead, M.D.	3 Nov. 1854	24 Oct. 1845	Staff	Netley.
David Stuart Erskine Bain, M.D.	3 Nov. 1854	23 Jan. 1846	Staff	Gravesend.
William Hanbury	3 Nov. 1854	3 April 1846	33rd Foot	Bombay.

SURGEONS—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.	Station.
Edward Baily Tuson	10 Nov. 1854	20 Aug. 1844	2nd Battalion, 17th Foot	Canada.
Henry March Webb, M.B.	8 Dec. 1854	23 Sept. 1845	18th Hussars	Hounslow.
Usher Williamson Evans, M.D.	8 Dec. 1854	3 April 1846	61st Foot	Jersey.
William Simpson, M.D.	8 Dec. 1854	1 May 1846	71st Foot	Bengal.
Michael Fenton Manifold	8 Dec. 1854	12 May 1846	34th Foot	Bengal.
Daniel Paterson Barry	8 Dec. 1854	7 Aug. 1846	1st Bat., Military Train	Woolwich.
Edward William Young, M.D.	8 Dec. 1854	7 Aug. 1846	1st Battalion, 60th Rifles	Tower.
Francis Reynolds	8 Dec. 1854	7 Aug. 1846	3rd Bat., Military Train	Canada.
Richard Gilborne	8 Dec. 1854	2 Oct. 1846	6th Dragoon Guards	Aldershot.
William Holmes Jephson, M.D.	12 Jan. 1855	12 July 1844	1st Dragoon Guards	Madras.
Alexander Smith, M.D.	12 Jan. 1855	7 Aug. 1846	47th Foot	Canada.
O'Connor D'Arcey, M.D.	12 Jan. 1855	2 Oct. 1846	4th Bat., Military Train	Aldershot.
William Deeble	12 Jan. 1855	27 Oct. 1846	56th Foot	Bombay.
Thomas Frederick Wall	12 Jan. 1855	20 Nov. 1846	38th Foot	Bengal.
Henry Fowle Smith, M.D.	12 Jan. 1855	23 Mar. 1847	Staff	Netley.
Edward William Bawtree, M.D	19 Jan. 1855	24 Nov. 1843	Staff	Canterbury.
Wellington Poole	9 Feb. 1855	1 Aug. 1845	54th Foot	Bengal.
James Edward Scott, M.D.	9 Feb. 1855	11 June 1847	4th Battalion, Rifle Brigade	Malta.
Thomas Connor O'Leary, M.B.	9 Feb. 1855	6 Aug. 1847	Royal Artillery	Woolwich.
John Sheldon Furlong, M.D.	9 Feb. 1855	19 Nov. 1847	42nd Foot	Bengal.
Thomas Crawford, M.D.	9 Feb. 1855	18 Feb. 1848	Staff	London.
Jenkin Homfray Llewelyn	9 Feb. 1855	17 Mar. 1848	8th Hussars	Bengal.
C.C. Anthony Dickson Home	9 Feb. 1855	17 Mar. 1848	Staff	Bengal.
Edward William Thomas Mandeville	16 Feb. 1855	25 Sept. 1846	2nd Battalion, 7th Foot	Gibraltar.
Dudley Hanley, M.D.	16 Feb. 1855	20 July 1847	Staff	China.
Thomas Fraser, M.D.	9 Mar. 1855	16 Dec. 1845	10th Hussars	York.
Edward Schaw Protheroe	16 Mar. 1855	10 June 1845	Royal Artillery	Mauritius.
Stanhope Hunter Fasson, M.D.	23 Mar. 1855	12 July 1844	Royal Artillery	Plymouth.
James Crerar	6 April 1855	3 Sept. 1847	4th Battalion, 60th Foot	Canada.
James Macmillan Scott Fogo	13 April 1855	5 Mar. 1854	Royal Artillery	Woolwich.

Robert Thornton	24 April 1855	6 July 1846	Staff	Liverpool.
Matthew Combe, M.D.	24 April 1855	20 July 1846	Royal Artillery	Gibraltar.
Henry Shearly Sanders	24 April 1855	5 Mar. 1847	49th Foot	Manchester.
James Leitch, M.D.	1 May 1855	23 Jan. 1846	41st Foot	Newcastle.
Charles Robert Robinson	1 May 1855	12 Nov. 1847	2nd Battalion, 25th Foot	Edinburgh.
William Johnstone Fyffe, M.D.	1 May 1855	27 Oct. 1848	5th Dragoon Guards	Dublin.
James Hamilton Bews	1 May 1855	1 Dec. 1848	Staff	New Zealand.
Jonas King Carr, M.D.	11 May 1855	24 July 1846	32nd Foot	Plymouth.
Patrick Joseph Clarke	11 May 1855	17 Mar. 1848	Staff	Buttevant.
Andrew Acres Stoney	11 May 1855	22 Dec. 1848	94th Foot	Bengal.
Alexander McArthur, M.D.	11 May 1855	22 Dec. 1848	2nd Bat., Military Train	Aldershot.
Philip Henry Eustace Cross	15 May 1855	22 Dec. 1848	58th Foot	Dublin.
Edward James Franklyn, M.D.	15 May 1855	18 Sept. 1849	7th Dragoon Guards	Bengal.
Henry Crisp, M.B.	22 June 1855	1 Oct. 1848	63rd Foot	Canada.
Neil Henry Stewart, M.D.	22 June 1855	1 Oct. 1848	98th Foot	Bengal.
William Pearson Ward	26 June 1855	14 June 1847	Royal Artillery	Woolwich.
John William Johnston, M.D.	29 June 1855	28 June 1844	85th Foot	Cape of Good Hope.
Alexander Mackay Macbeth	29 June 1855	21 July 1846	5th Bat., Military Train	Woolwich.
John Coghlan Haverty	29 June 1855	3 April 1849	52nd Foot	Bengal.
George Smyth King, M.D.	29 June 1855	3 April 1849	1st Battalion, 14th Foot	Jamaica.
John Gorringe, M.D.	29 June 1855	3 April 1849	1st Battalion, 4th Foot	Bombay.
George Waterloo Pennington Sparrow, M.D.	6 July 1855	21 Sept. 1846	3rd Battalion, 60th Rifles	New Zealand.
John Small	10 July 1855	30 Dec. 1845	Staff	Mauritius.
Henry Day Fowler	20 July 1855	19 Dec. 1845	82nd Foot	Bengal.
William Thomas Black	20 July 1855	25 Sept. 1846	2nd Battalion, 11th Foot	Cape of Good Hope.
John Rambant, M.D.	20 July 1855	29 Jan. 1847	Royal Canadian Rifles	Canada.
John Andrew Woolfreyes, M.D.	20 July 1855	13 July 1847	6th Bat., Military Train	Curragh.
Thomas Rhys	20 July 1855	3 July 1848	Royal Artillery	Bengal.
Charles Walter Poulton	20 July 1855	8 June 1849	Staff	West Australia.
Daniel John Doherty	20 July 1855	28 Aug. 1849	1st Battalion, 13th Foot	Bengal.
William Perry	20 July 1855	13 Sept. 1849	Royal Artillery	Portsmouth.
Eneas Mackintosh Macpherson	10 Aug. 1855	10 Aug. 1845	Staff	Cape of Good Hope.
James Fraser, M.D.	25 Sept. 1855	1 July 1848	50th Foot	Ceylon.
Andrew Leith Adams, M.D.	25 Sept. 1855	20 Oct. 1848	1st Battalion, 22nd Foot	Malta.
Edward Gilborne	5 Nov. 1855	28 Aug. 1844	Royal Artillery	Canada.

SURGEONS—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.	Station.
John Riggs Miller Lewis, M.D.	7 Dec. 1855	11 Feb. 1848	Royal Artillery	Nova Scotia.
Thomas Park	21 Dec. 1855	13 Sept. 1849	Royal Artillery	Malta.
Raphael Woolman Read	28 Dec. 1855	31 May 1844	30th Foot	Canada.
Gavin Ainslie Turnbull	28 Dec. 1855	15 Mar. 1850	6th Dragoons	Bombay.
John Duff, M.D.	8 Jan. 1856	11 May 1849	Royal Artillery	Montreal.
John Coates, M.D.	25 Jan. 1856	16 Nov. 1849	26th Foot	Aldershot.
John Alexander William Thompson, M.D.	26 Feb. 1856	19 Nov. 1844	80th Foot	Bengal.
Henry Vereker Bindon, M.D.	25 May 1856	12 June 1846	Staff	Fermoy.
Robert Browne	14 July 1856	1 Mar. 1844	83rd Foot	Dover.
Richard Edward FitzGibbon	22 July 1856	10 Jan. 1851	Staff	Bengal.
Thomas Ligertwood, M.B.	20 Oct. 1856	20 Oct. 1851	4th Hussars	Newbridge.
John Hendley	5 Dec. 1856	14 Mar. 1851	1st Battalion, 7th Foot.	Bengal.
Stanhope Hunter Fasson, M.D.	19 Feb. 1857	12 July 1844	Royal Artillery	Devonport.
Frederick Robinson, M.D.	20 Mar. 1857	19 Nov. 1847	1 Bat., Scots Fusilier Gds.	London.
Richard Domenichetti, M.D.	10 June 1857	3 April 1846	75th Foot	Devonport.
Alexander Peile Cahill, M.D.	28 Aug. 1857	3 April 1846	1st Battalion, 6th Foot	Portsmouth.
John James Clifford, M.D.	28 Aug. 1857	7 Aug. 1846	9th Lancers	Brighton.
William Lapsley	28 Aug. 1857	7 Aug. 1846	Staff	Jersey.
James Davys	4 Sept. 1857	9 Sept. 1851	Staff	Bengal.
Thomas Esmonde White, M.D.	2 Oct. 1857	26 Sept. 1845	65th Foot	New Zealand.
Henry Frederick Robertson	2 Oct. 1857	19 Dec. 1845	40th Foot	New Zealand.
Brinsley Nicholson, M.D	2 Oct. 1857	25 Sept. 1846	Staff	Chatham.
John Madden	2 Oct. 1857	2 Oct. 1846	2nd Battalion, 8th Foot	Gibraltar.
James William Fleming	2 Oct. 1857	27 Oct. 1846	37th Foot	Jersey.
Joseph Thomas La Presle	2 Oct. 1857	29 Dec. 1846	3rd Battalion, Rifle Brigade	Bengal.
Gordon Kenmure Hardie, M.D.	2 Oct. 1857	12 Feb. 1847	73rd Foot	Plymouth.
Henry Higgins Jones, M.D.	2 Oct. 1857	10 Dec. 1847	86th Foot.	Waterford.
James Lewis Holloway	2 Oct. 1857	17 Mar. 1848	2nd Battalion, 24th Foot	Mauritius.
James Kellie, M.D.	2 Oct. 1857	5 May 1848	17th Lancers	Madras.
David Field Rennie, M.D.	2 Oct. 1857	19 July 1848	31st Foot	China.

James Edward Clutterbuck, M.D.	2 Oct. 1857	22 Dec. 1848	Staff..	Canada.
Grahame Auchinleck, M.D.	2 Oct. 1857	22 Dec. 1848	81st Foot	Bengal.
Frederick Douglas, M.D.	2 Oct. 1857	30 Mar. 1849	2nd Battalion, 10th Foot	Cape of Good Hope.
Henry Martyn Fraser, M.D.	2 Oct. 1857	15 June 1849	2nd Battalion, Rifle Brigade	Bengal.
George William Peake, M.D.	2 Oct. 1857	3 Aug. 1849	2nd Battalion, 18th Foot	New Zealand.
Arthur Rudge	2 Oct. 1857	13 Sept. 1849	Royal Artillery	Shorncliffe.
Edward Touch, M.D.	2 Oct. 1857	25 Sept. 1849	46th Foot	Bengal.
John Irvine, M.D.	2 Oct. 1857	16 Nov. 1849	1st Battalion, 8th Foot	Sheffield.
John Gibbons	3 Nov. 1857	22 Mar. 1850	95th Foot	Bombay.
Richard Cooper Todd	3 Nov. 1857	19 April 1850	Staff..	Dublin.
Jones Lamprey, M.B.	3 Nov. 1857	7 June 1850	67th Foot	China.
W. C. Herbert Taylor Reade	3 Nov. 1857	9 Aug. 1850	Staff..	Jersey.
Robert McNab, M.D.	26 Jan. 1858	24 Sept. 1850	Staff..	Preston.
Robert Beresford Smyth, M.D.	26 Jan. 1858	8 Oct. 1850	2nd Battalion, 22nd Foot	Malta.
Daniel Macqueen, M.D.	26 Jan. 1858	5 Nov. 1850	Staff..	Stirling.
Howell Walters Voss	26 Jan. 1858	3 Jan. 1851	Royal Artillery	Dover.
James Carroll, M.D.	26 Jan. 1858	3 Jan. 1851	1st Battalion, 9th Foot	Corfu.
Dudley Clifton Wodsworth	26 Jan. 1858	10 Jan. 1851	Staff..	Bengal.
William Sim Murray, M.B.	26 Jan. 1858	10 Jan. 1851	66th Foot	Madras.
William Armstrong	26 Jan. 1858	10 Jan. 1851	2nd Battalion, 9th Foot	Corfu.
George Peacocke, M.D.	26 Jan. 1858	10 Jan. 1851	Staff..	Maidstone.
Thomas Carey	26 Jan. 1858	24 Jan. 1851	87th Foot	Curragh.
Archibald Henry Fraser	26 Jan. 1858	21 Feb. 1851	88th Foot	Bengal.
George Edwin Gains	26 Jan. 1858	21 Feb. 1851	2nd Battalion, 6th Foot	Corfu.
John Edward Moffatt	26 Jan. 1858	14 Mar. 1851	Staff..	Canada.
Henry Bolton Hassard	26 Jan. 1858	14 Mar. 1851	1st Battalion, 19 Foot	Bengal.
Charles William Woodroffe	26 June 1858	21 Mar. 1851	2nd Battalion, 1st Foot	Aldershot.
Benjamin Tydd	16 July 1858	25 Mar. 1851	2nd Battalion, 23rd Foot	Malta.
George Pain	30 July 1858	8 May 1851	Royal Artillery	Woolwich.
William James Ingham	24 Aug. 1858	9 May 1851	Staff..	Jamaica.
~~Francis Holton, M.B.~~	24 Aug. 1858	14 May 1851	77th Foot	Bengal.
William Boyd	7 Sept. 1858	20 Feb. 1852	Staff..	Bengal.
Thomas Bassett Reid	5 Oct. 1858	16 May 1851	92nd Foot	Bengal.
~~Thomas Blatherwick~~	31 Dec. 1858	4 June 1847	Staff..	Cork.
John Knox Leet	31 Dec. 1858	20 May 1851	Cape Mounted Rifles	Cape of Good Hope.

SURGEONS—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.	Station.
William Arthur Thomson, M.B.	31 Dec. 1858	4 Sept. 1851	27th Foot	Bengal.
George Paul Minchin Woodward, M.D.	31 Dec. 1858	12 Sept. 1851	2nd Battalion, 20th Foot	Portsmouth.
Alexander Scott Fogo, M.D.	31 Dec. 1858	7 Oct. 1851	Royal Artillery	Woolwich.
Robert Thomas Buckle, M.D.	31 Dec. 1858	14 Oct. 1851	2nd Battalion, 15th Foot	Malta.
Francis Cogan	31 Dec. 1858	18 Nov. 1851	Staff	Fermoy.
Patrick McDermott, M.D.	31 Dec. 1858	25 Nov. 1851	Staff	Chatham.
John Lyster Jameson	31 Dec. 1858	15 Dec. 1851	Staff	Canada.
Arthur Bell	31 Dec. 1858	2 Jan. 1852	76th Foot	Aldershot.
Charles Thompson Abbott, M.B.	31 Dec. 1858	18 Mar. 1853	39th Foot	Bermuda.
Thomas Llewellyn Nash, M.D.	18 Jan. 1859	14 Feb. 1852	Royal Artillery	Aldershot.
Theodore Gordon Bone, M.D.	18 Jan. 1859	17 Feb. 1852	Staff	Colchester.
Donald Sinclair Smith	28 Jan. 1859	27 Feb. 1852	Staff	Aberdeen.
Henry Bowles Franklin, M.D.	11 Mar. 1859	10 Mar. 1852	1st Battalion, 10th Foot	Dublin.
John Phillips Cunningham, M.D.	11 Mar. 1859	13 April 1852	2nd Battalion, 60th Rifles	Portsmouth.
Thomas George FitzGerald	8 April 1859	13 April 1852	Staff	London.
John O'Nial	5 May 1859	13 April 1852	51st Foot	Bengal.
Duncan Robertson Rennie	18 Nov. 1859	27 April 1852	Staff	Athlone.
Cornelius Clark Rutherford	2 Dec. 1859	7 May 1852	99th Foot	China.
William Skeen, M.D.	13 Dec. 1859	8 Mar. 1855	4th West India Regiment	West Indies.
Patrick Andrew McDermott	16 Dec. 1859	25 Nov. 1851	3rd West India Regiment	Jamaica.
Frederick George Kerin	31 July 1860	1 July 1848	2nd Life Guards	London.
Thomas Clark Brady	11 Sept. 1860	9 May 1852	Staff	Fermoy.
John Smith Chartres	11 Sept. 1860	9 May 1852	100th Regiment	Gibraltar.
Benjamin Lane	11 Sept. 1860	3 July 1852	2nd Battalion, 4th Foot	Cephalonia.
Arthur Jackson Greer	11 Sept. 1860	3 July 1852	1st Battalion, 21st Foot	Barbadoes.
Thomas William Fox, M.B.	18 Sept. 1860	5 July 1852	Staff	Woolwich.
John Meane	21 Sept. 1860	5 Nov. 1852	Staff	Templemore.
Thomas Knox Birnie	25 Sept. 1860	23 Nov. 1852	2nd Battalion, 12th Foot	Curragh.
Alexander Fisher Bartley	25 Sept. 1860	23 Dec. 1852	1st Battalion, 12th Foot	New South Wales.
John Alexander McMunn, M.D	16 Nov. 1860	1 Jan. 1853	Staff	Chelsea Hospital.

John James Scott	16 Nov. 1860	21 Jan. 1853	Staff	West Indies.
William Snell	15 Feb. 1861	6 May 1853	Staff	Chatham.
Curtiss Martin	22 Feb. 1861	15 Feb. 1855	2nd West India Regiment	Bahamas.
Augustus Morphew	18 June 1861	18 Jan. 1856	1st West India Regiment	Barbadoes.
Charles O'Callaghan	6 Aug. 1861	15 Dec. 1854	Staff	West Coast of Africa.
Watkin Sandom Whylock, M.D.	14 Jan. 1862	25 Dec. 1852	Staff	Canterbury.
Joseph Coleman Hornsby Wright, M.D.	14 Jan. 1862	1 Jan. 1853	Staff	Ceylon.
Robert Speedy	14 Jan. 1862	11 Mar. 1853	45th Foot	Dublin.
James Nicholas Bell, M.D.	14 Jan. 1862	1 April 1853	Staff	Netley.
Johnston Ferguson	14 Jan. 1862	22 April 1853	Staff	West Indies.
William Alexander Mackinnon	28 Jan. 1862	18 Feb. 1853	57th Foot	
William Tydd Harding	28 Jan. 1862	13 May 1853	2nd Battalion, 19th Foot	Newry.
William Beale Wallis	28 Jan. 1862	27 May 1853	Staff	Jamaica.
Digby William Lawlor	28 Jan. 1862	10 June 1853	1st Battalion, 25th Foot	Malta.
Joshua Henry Porter	18 Feb. 1862	17 June 1853	97th Foot	Bengal.
Alexander Clark Ross, M.D.	16 May 1862	1 July 1853	Staff	China.
John Bradshaw	10 June 1862	7 May 1858	Staff	Gambia.
John Ogilvy, M.D.	8 July 1862	15 July 1853	Staff	Bombay.
Augustus Frederick Turner	8 July 1862	26 July 1853	Staff	Limerick.
William Stewart, M.D.	8 July 1862	29 July 1853	Staff	Bengal.
William Mackenzie Skues, M.D.	8 July 1862	29 July 1853	Staff	Bombay.
James Sinclair, M.D.	29 July 1862	5 Aug. 1853	Staff	Gibraltar.
Francis Lewis Fitzgerald	29 July 1862	12 Aug. 1853	2nd Battalion, 2nd Foot	Gibraltar.
William Sinclair, M.D.	29 July 1862	2 Sept. 1853	Staff	
Charles Vidler Cay	9 Jan. 1863	12 June 1846	Coldstream Guards	London.
Frederick Oakes	13 Feb. 1863	27 Feb. 1856	Staff	Sierra Leone.
James William Crow	13 Feb. 1863	30 April 1858	Staff	Gold Coast.
James Arthur Hanbury, M.B.	20 Feb. 1863	7 May 1858	63rd Foot	Canada.
Robert Fleetwood Andrews	3 Mar. 1863	30 Sept. 1853	Staff	Chatham.

ASSISTANT-SURGEONS.

Name.	Date of Commission.	Service.	Station.
Arthur Guy Elkington ..	11 Mar. 1853	2nd Bat., Sc. Fus. Gds.	Canada.
Constantine Caridi Read ..	13 May 1853	3rd Bat. Gren. Gds...	London.
William Alex. White, M.D.	18 Oct. 1853	Staff	Bengal.
Duncan A. C. Fraser, M.D.	28 Oct. 1853	76th Foot	Aldershot.
John Eldon Young, M.D...	28 Oct. 1853	Staff	Eastbourne.
Frederick William Moore ..	28 Oct. 1853	Staff	C. of G. Hope.
Thomas Ravenscroft Whitty	11 Nov. 1853	2nd Bat., 5th Foot ..	C. of G. Hope.
John Clarke, M.D.	13 Dec. 1853	1st Bat., 10th Foot ..	Dublin.
John Coote Ovens	16 Dec. 1853	Staff	Dublin.
John Halyburton Ross, M.B.	16 Dec. 1853	39th Foot	Bermuda.
Thomas M. Bleckley	6 Jan. 1854	1st Bat., 14th Foot ..	Jamaica.
Walter Moses Gibaut ..	3 Feb. 1854	1st Bat., 17th Foot ..	Quebec.
Edward Gregg Noot	10 Feb. 1854	S. A. S.	Portsmouth.
Henry John H. Lawrence, ..	24 Feb. 1854	1st Bat., Gren. Gds...	Canada.
Robert Graves Burton, M.D.	24 Feb. 1854	Staff	Woolwich.
Robert Menzies	24 Feb. 1854	Staff	Winchester.
Chamney Graves Irwin, M.B.	24 Feb. 1854	28th Foot	Bombay.
Francis Bramley Baker ..	3 Mar. 1854	1st Bat., Sco. Fus. Gds.	Canada.
Jas. Balfour Cockburn, M.D.	3 Mar. 1854	Artillery	Sheerness.
Thomas R. Williams, M.B.	24 Mar. 1854	Staff	Aldershot.
John Henry West, M.D. ..	24 Mar. 1854	1st Bat., 21st Foot ..	Barbadoes.
James Henry Lewis	24 Mar. 1854	Staff	Cork.
John By Cole Reade	24 Mar. 1854	2nd Bat., Rifle Brigade	Bengal.
Andrew Knox Drysdale ..	24 Mar. 1854	79th Foot	Bengal.
William Marshall Webb ..	28 Mar. 1854	Staff	Bengal.
William Wilson Mills ..	28 Mar. 1854	63rd Foot	Canada.
Edward M. Sinclair, M.D...	28 Mar. 1854	97th Foot	Bengal.
Charles James White.. ..	28 Mar. 1854	12th Lancers.. ..	Aldershot.
William Cattell	28 Mar. 1854	5th Dragoon Guards	Dublin.
Ormsby Bowen Miller ..	28 Mar. 1854	11th Dragoons ..	Cahir.
William A. Davidson, M.D.	28 Mar. 1854	Staff	Parkhurst.
Lancelot Armstrong	7 April 1854	13th Hussars ..	Aldershot.
James Ekin, M.B.	7 April 1854	1st Bat., 4th Foot ..	Bombay.
Alfred Malpas Tippetts ..	7 April 1854	Staff	Bengal.
David Milroy, M.D.	7 April 1854	30th Foot	Canada.
Thomas Clarke	7 April 1854	33rd Foot	Bombay.
William Younge Jeeves ..	7 April 1854	Royal Artillery ..	Cork.
Frederick Tydd Abbott ..	7 April 1854	41st Foot	Newcastle.
Alexander Maclean	7 April 1854	Royal Artillery ..	Bombay.
George Frederick Davis ..	7 April 1854	50th Foot	Ceylon.
Alexander Humfrey	7 April 1854	Staff	Athlone.
Edward Louis Lundy ..	7 April 1854	Staff	Haulbowline.
Wm. Henry Pollard, B.A.	7 April 1854	Royal Artillery ..	Dover.
David Woods	7 April 1854	Staff	Colchester.
James Hannan	7 April 1854	49th Foot	Manchester.
Thomas Wright	21 April 1854	38th Foot	Bengal.
Thomas John Murphy, M.A.	28 April 1854	Staff	Aldershot.
Peter Nevile Jackson	28 April 1854	1st Bat., 13th Foot ..	Bengal.
Francis S. Bennet Francois de Chaumont, M.D. ..	28 April 1854	4th Bat., Rifle Brigade	Malta.
Alexander Guthrie, M.D...	28 April 1854	3rd Bat., Rifle Brigade	Bengal.
Edward Young Kellett ..	28 April 1854	Staff	Curragh.
Robert Augustus Chapple ..	28 April 1354	Royal Artillery ..	Guernsey.
Charles Ricketts	28 April 1854	1st Bat., 7th Foot ..	Bengal.
Lucas George Hooper ..	28 April 1854	10th Hussars ..	York.
Grahame Young	5 May 1854	2nd Bat., 60th Rifles..	Portsmouth.
Robert Atkinson	5 May 1854	45th Foot	Dublin.
Charles Carroll Dempster..	5 May 1854	Staff	Limerick.
John Joseph Muloch	5 May 1854	1st Dragoons ..	Birmingham.

ASSISTANT-SURGEONS—*continued*,

NAME.	Date of Commission.	Service.	Station.
Samuel Joseph Bayfield ..	5 May 1854	Staff	
Stephen Massett Webb, M.D.	19 May 1854	36th Foot	Dublin.
Allen Bryson, M.D.	19 May 1854	Staff	Chatham.
Henry Turner	19 May 1854	2nd Bat., Sc. Fus. Gds.	Canada.
Robert Wyatt Meadows ..	26 May 1854	Canadian Rifles ..	Canada.
Alexander Reid	26 May 1854	54th Foot	Bengal.
Robert William Jackson ..	26 May 1854	86th Foot	Kilkenny.
Robert Watson	26 May 1854	Staff	Colchester.
Richard Hungerford	26 May 1854	Staff	Ceylon.
Alex. Robert Hudson, M.B.	26 May 1854	1st Bat., 6th Foot. ..	Portsmouth.
William Menzies Calder ..	26 May 1854	Staff	Jersey.
William Henry Price.. ..	26 May 1854	89th Foot	Bengal.
William Jasper Rendell ..	26 May 1854	55th Foot	Portsmouth.
Thomas Sheehy, M.D. ..	26 May 1854	1st Bat., 7th Foot ..	Bengal.
George Youell	26 May 1854	Staff	Nova Scotia.
Henry Titterton, M.D. ..	26 May 1854	Staff	Tasmania.
Duncan C. Taylor, M.D. ..	26 May 1854	Staff	Preston.
Leonard Kidd, M.B.	26 May 1854	27th Foot	Bengal.
John William Trotter ..	26 May 1854	2nd Bat., Coldst. Gds.	London.
John Tulloch	7 June 1854	St. Helena Regiment	St. Helena.
Wallace Haward	7 June 1854	Staff	Canterbury.
George Floyer Bankes Arden	9 June 1854	1st. Bat., 12th Foot ..	New S. Wales.
George Bell Poppelwell ..	9 June 1854	Staff	Belfast.
William Grantt, M.B. ..	9 June 1854	31st Foot	China.
Samuel Stacy Skipton, M.D.	9 June 1854	78th Foot	Shorncliffe.
James Petrie Street, M.D.	9 June 1854	Staff	
Thomas Tarrant..	16 June 1854	Royal Artillery ..	Woolwich.
Alfred Hooper	16 June 1854	42nd Foot	Bengal.
Exham Long Hiffernan ..	16 June 1854	Staff	Chatham.
Edward Thiselton	20 June 1854	Staff	Canterbury.
Leslie Ogilby Patterson ..	20 June 1854	Canadian Rifles ..	Canada.
Edmund Humphrey Roberts	23 June 1854	Staff	Corfu.
James Hornidge Finnemore	23 June 1854	Royal Artillery ..	Ballincollig.
George Allan Hutton.. ..	23 June 1854	Staff	Chatham.
Alexander Dudgeon Gulland	23 June 1854	Royal Artillery ..	China.
Thomas Teevan	30 June 1854	1st Bat., 3rd Foot ..	Aldershot.
John Sparrow	30 June 1854	Staff	Bengal.
William Hemphill, M.D. ..	14 July 1854	Staff	Shorncliffe.
Richard C. Lofthouse, M.D.	14 July 1854	14th Dragoons ..	Manchester.
Joseph John Thompson ..	14 July 1854	Ceylon Rifles ..	Ceylon.
Daniel O'Donovan, M.D. ..	14 July 1854	Staff	Jamaica.
Joseph Barker	15 July 1854	Royal Artillery ..	Dorchester.
Henry Clifford	15 July 1854	Royal Artillery ..	Dublin.
Hamilton Mitchell	21 July 1854	96th Foot	C. of G. Hope.
Rowland Winburn Carter..	28 July 1854	82nd Foot	Bengal.
Richard Wolseley	28 July 1854	Staff	Nova Scotia.
Ralph Robert Scott	28 July 1854	8th Hussars	Bengal.
Francis Odell	28 July 1854	Staff	Bombay.
William Ramsay Stewart ..	11 Aug. 1854	Royal Artillery ..	Canada.
John Crown Agnis	11 Aug. 1354	Royal Horse Guards..	London.
Chars. Jas. Davenports, M.D.	15 Aug. 1854	6th Dragoon Guards	Aldershot.
Francis Trevelyan Buckland	15 Aug. 1854	2nd Life Guards ..	London.
Francis Collins, M.D. ..	1 Sept. 1854	Royal Military College	Sandhurst.
John Low Erskine, M.D. ..	1 Sept. 1854	Royal Engineers ..	Malta.
James Castor Smith	1 Sept. 1854	1st Bat., 19th Foot ..	Bengal.
William Thomas Paliologus	1 Sept. 1854	Staff	Netley.
Theophilus Dolan	1 Sept. 1854	Staff	Bombay.
David Cullen, M.D.	1 Sept. 1854	17th Dragoons ..	Madras.
Richard William Meade ..	1 Sept. 1854	88th Foot	Bengal.
William Ferguson	22 Sept. 1854	Royal Engineers ..	Aldershot.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station.
Michael James Griffin ..	22 Sept. 1854	Staff	Dublin.
William Macnamara	6 Oct. 1854	4th Dragoon Guards	Dublin.
George Henry Finlay ..	6 Oct. 1854	Staff	Ceylon.
John Vernon Seddall, M.D.	13 Oct. 1854	Staff	B. Columbia.
John Carleton Clery	13 Oct. 1854	9th Dragoons ..	Brighton.
John Henry Hearn	13 Oct. 1854	Royal Artillery ..	Bengal.
Joseph Johnston, M.D. ..	27 Oct. 1854	26th Foot	Aldershot.
Angus John Mackay, M.D.	27 Oct. 1854	Staff	Fermoy.
Arthur E. T. Longhurst, M.D.	27 Oct. 1854	Staff	Bengal.
Augustus P. M. Corbett, M.D.	27 Oct. 1854	Royal Artillery ..	Bengal.
George Richard Woolhouse	29 Oct. 1854	Staff	Bengal.
Sydney Alder	3 Nov. 1854	62nd Foot	Nova Scotia.
James Crosse Johnston ..	3 Nov. 1854	Royal Artillery ..	Woolwich.
Tertius Ball, M.D.	3 Nov. 1854	Staff	Chatham.
Thomas Smith Hollingsworth	3 Nov. 1854	Royal Engineers ..	Mauritius.
John Martin Hyde	3 Nov. 1854	84th Foot	Shorncliffe.
Jeffry Allen Marston, M.D.	10 Nov. 1854	Royal Artillery ..	Portsmouth.
Andrew Semple, M.D. ..	10 Nov. 1854	Staff	Portsmouth.
Gilbert Prout Girdwood ..	24 Nov. 1854	1st Bat., Gren. Gds..	Canada.
Walter Leach	24 Nov. 1854	Staff	Cork.
Oliver Barnett	24 Nov. 1854	6th Dragoons ..	Bombay.
William Henry Yates ..	24 Nov. 1854	Staff	London.
Francis Henry Macfadin ..	1 Dec. 1854	1st Bat., 11th Foot ..	Cork.
William Fleming Cullen ..	1 Dec. 1854	Staff	Canterbury.
William Carden Roe.. ..	1 Dec. 1854	Staff	Ceylon.
George Moulas Slaughter ..	13 Dec. 1854	Staff	
James McNeill Beatty ..	14 Dec. 1854	98th Foot	Bengal.
John Wild Hulseberg ..	14 Dec. 1854	1st Bat., 1st Foot ..	Madras.
T. E. Hale, M.D., B.A. ..	14 Dec. 1854	1st Bat., 7th Foot ..	Bengal.
Charles Dodgson Madden..	14 Dec. 1854	Staff	Chatham.
Sampson Roch	14 Dec. 1854	Royal Artillery ..	Mauritius.
William Hen. Corbett, M.D.	15 Dec. 1854	Staff	Limerick.
Randolph Webb..	15 Dec. 1854	Royal Artillery ..	Woolwich.
James Jardine, M.D... ..	15 Dec. 1854	Staff	Cliff End Fort.
Henry Sherlock	15 Dec. 1854	8th Dragoons ..	Bengal.
William Ramsay, M.D. ..	15 Dec. 1854	Staff	Dublin.
Stephen Henry Dickerson ..	23 Dec. 1854	Royal Artillery ..	Plymouth.
George McGusty Carolan ..	23 Dec. 1854	72nd Foot	Bombay.
Herbert Chalmers Miles ..	23 Dec. 1854	Royal Artillery ..	Woolwich.
William Ralp Lane	29 Dec. 1854	2nd Bat., Gren. Gds.	London
Henry Lloyd Randell ..	5 Jan. 1855	Royal Engineers ..	Chatham.
John George Faught	5 Jan. 1855	46th Foot	Bengal.
Clement Williams	5 Jan. 1855	68th Foot	Birmah.
Edward McGill, M.D. ..	8 Jan. 1855	7th Dragoon Guards	Bengal.
John Michael	10 Jan. 1855	Staff	Jamaica.
John Wood,.	10 Jan. 1855	Royal Artillery ..	Aldershot.
Thomas Jerram Orton ..	17 Jan. 1855	Royal Artillery ..	Bengal.
Patrick Kilgour	17 Jan. 1855	79th Foot	Bengal.
William Henry Muschamp	23 Jan. 1855	82nd Foot	Bengal.
Alfred Jos. Lumby Hepworth	26 Jan. 1855	Royal Artillery ..	Newbridge.
George Perry	29 Jan. 1855	1st Bat., Sc. Fus. Gds.	London.
Edwin James Hopwood ..	29 Jan. 1855	Royal Artillery ..	Portsmouth.
William Stockwell	31 Jan. 1855	Staff	Parkhurst.
Stewart Aaron Lithgow ..	3 Feb. 1855	3rd Dragoon Guards	Bombay.
Emil Becher, M.D.	13 Feb. 1855	Staff	Bengal.
Morgan Jones Jones	15 Feb. 1855	Staff	Pembroke.
Wm. George Nich. Manley	20 Feb. 1855	Royal Artillery ..	Aldershot.
Andrew Robertson Smith ..	21 Feb. 1855	Royal Artillery ..	Sheerness.
Thomas Stanell Barry ..	22 Feb. 1855	86th Foot	Waterford.
Robert Henry Beale	22 Feb. 1855	53rd Foot	Portsmouth.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station.
Frederick Mackenzie Skues	28 Feb. 1855	Staff	Sierra Leone.
Henry Joseph Rose	6 Mar. 1855	1st Bat., 2nd Foot ..	Aldershot.
William Henry Harris ..	10 Mar. 1855	32nd Foot	Plymouth.
Charles Alex. Innes, M.D.	14 Mar. 1855	16th Lancers.. ..	Sheffield.
John Copeland Knipe ..	14 Mar. 1855	Staff	Curragh.
Charles John Kirwan ..	20 Mar. 1855	Staff	Bengal.
John Noble Shipton	23 Mar. 1855	2nd Dragoon Guards	Bengal.
W.C. V. M. McMaster, M.D.	27 Mar. 1855	6th Dragoons ..	Bombay.
Alfred Hoyte	27 Mar. 1855	61st Foot	Jersey.
Thomas Kennedy	30 Mar. 1855	Staff	Chatham.
Nathaniel Norris	2 April 1855	Staff	Preston.
James Robert Crawford ..	2 April 1855	Staff	Fermoy.
John Whittle Rimmer ..	2 April 1855	Royal Artillery ..	Bengal.
George Baly	4 April 1855	3rd Bat., Rifle Brigade	Bengal.
Joseph Watts	5 April 1855	1st Dragoon Guards	Madras.
George Thomas Bourke ..	8 April 1855	51st Foot	Bengal.
David Stranaghan, M.D. ..	8 April 1855	Staff	Cork.
Alexander Robert Kilroy ..	12 April 1855	33rd Foot	Bombay.
Bradford Stiles	14 April 1855	40th Foot	New Zealand.
Charles Moore Jessop ..	17 April 1855	Staff	Chatham.
Robert Turner	17 April 1855	Staff	Malta.
William Robert Burkitt ..	17 April 1855	74th Foot	Madras.
John Harrison Robotham..	23 April 1355	7th Dragoon Guards	Bengal.
William Langford Farmer	24 April 1855	29th Foot	Glasgow.
Andrew Knox Rickards ..	24 April 1855	Royal Artillery ..	Shorncliffe.
William Fletcher	4 May 1855	Royal Artillery ..	Plymouth.
John Denis Healy	5 May 1855	1st Bat., 15th Foot ..	Canada.
William Henry Leslie, M.D.	7 May 1855	48th Foot	Bengal.
John Folliott	7 May 1855	51st Foot	Bengal.
George Langford Hinde ..	15 May 1855	Staff	Canada.
Jno. Hen. Gouldsbury Meares	16 May 1855	Royal Engineers ..	Corfu.
Rich. Uniacke Cashman, M.D.	18 May 1855	Royal Artillery ..	Madras.
Edwin Wilson	19 May 1855	4th Dragoons ..	Newbridge.
Alex. Crawford Robertson..	1 June 1855	Royal Artillery ..	Canada.
William Sharpe..	6 July 1855	Staff	Netley.
James Alfred Turner.. ..	7 July 1855	Royal Artillery ..	Limerick.
James Kelly	17 July 1855	Staff	Bengal.
Thomas John Tucker.. ..	18 July 1855	2nd Bat., 10th Foot ..	Dublin.
Samuel Fuller	23 July 1855	17th Dragoons ..	Madras.
James Francis Deakin, M.D.	28 July 1855	Staff	Fermoy.
Hector Ferguson	30 July 1855	Staff	Canada.
Samuel Black Roe, M.B. ..	4 Aug. 1855	92nd Foot	Bengal.
Francis John Shortt	6 Aug. 1855	Staff	Bermuda.
Hen. Rich. Lobb Veale, M.D.	14 Aug. 1855	Royal Artillery ..	Leith.
James Greig Leisk, M.B. ..	28 Aug. 1855	94th Foot	Bengal.
Henry Alexander Gogarty	29 Aug. 1855	52nd Foot	Bengal.
Henry Kelsall	8 Sept. 1855	1st Bat., 20th Foot ..	Bengal.
Charles Christopher Piper..	12 Sept. 1855	2nd Bat., 9th Foot ..	Corfu.
William Collis	14 Sept. 1855	98th Foot	Bengal.
William Henry Jenkins ..	24 Sept. 1855	Staff	Jamaica.
Thomas Norton Hoysted ..	28 Sept. 1855	77th Foot	Bengal.
Thos. Butler Power O'Brien	29 Sept. 1855	Staff	Canada.
Francis Hyde Forshall ..	3 Oct. 1855	Royal Artillery ..	Hilsea.
Nicholas Ffolliott	13 Oct. 1855	Staff	Bengal.
Edmund Greswold McDowell	6 Nov. 1855	Staff	
Benjamin Cowan Kerr ..	17 Nov. 1855	2nd Bat., 6th Foot ..	Corfu.
Yorke Hobart Johnson ..	20 Nov. 1855	Staff	Walmer.
John Goodwin	5 Dec. 1855	Staff	Shorncliffe.
James Bonnyman, M.B. ..	13 Dec. 1855	89th Foot	Bengal.
Ebenezer John Hatchell ..	15 Jan. 1856	1st Bat., 60th Foot ..	Tower of Lon.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station.
John James Henry	18 Jan. 1856	43rd Foot	Bengal.
William Barry	25 Jan. 1856	58th Foot	Dublin.
John Mundy	4 Feb. 1856	1st Bat., 20th Foot ..	Bengal.
Eugene Francis O'Leary ..	9 Feb. 1856	Royal Artillery ..	Madras.
Samuel Pratt Woodfull ..	9 Feb. 1856	Royal Artillery ..	Canada.
William O'Halloran	18 Feb. 1856	74th Foot	Madras.
Maximilian Grant, M.D. ..	10 Mar. 1857	2nd Life Guards ..	London.
George Palatiano, M.D. ..	8 April 1857	Staff	Corfu.
Alex. Frederick Bradshaw..	27 May 1857	2nd Bat., Rifle Brigade	Bengal.
Charles James Kinnahan ..	27 May 1857	Staff	Fermoy.
Edw. Louis McSheehy, M.D.	27 May 1857	1st Dragoon Guards	Madras.
James Parr..	28 May 1857	55th Foot	Portsmouth.
James Bowyer Baker.. ..	28 May 1857	80th Foot	Bengal.
Thos. Allen Thornhill, M.B.	28 May 1857	7th Dragoons ..	Bengal.
Robert Arthur Elliott ..	30 May 1857	95th Foot	Bombay.
Thomas Rawlings Mould ..	31 May 1857	Royal Artillery ..	Clonmel.
John Wallace	2 June 1857	94th Foot	Bengal.
Robert Lewer	1 Aug. 1857	Royal Artillery ..	Aldershot.
Edmund McGrath	1 Aug. 1857	94th Foot	Bengal.
Arthur Chester	1 Aug. 1857	Royal Artillery ..	Mauritius.
Charles Henry Browne ..	1 Aug. 1857	15th Hussars ..	Dundalk.
Thomas Rudd, M.D.	1 Aug. 1857	2nd Dragoons ..	Edinburgh.
Thomas Sharkey..	1 Aug. 1857	97th Foot	Bengal.
Frederick Ffolliott	1 Aug. 1857	1st Bat., 18th Foot ..	Madras.
George Samuel Burnside ..	1 Aug. 1857	51st Foot.	Bengal.
Alexander S. Russell, M.D.	1 Aug. 1857	27th Foot	Bengal.
Richard Armstrong Hyde ..	17 Aug. 1857	2nd Bat., 20th Foot..	Portsmouth.
Edward Joseph Crane ..	18 Aug. 1857	90th Foot	Bengal.
William Samuel Chapman	15 Sept. 1857	37th Foot	Jersey.
Philip Broke Smith, M.D...	15 Sept. 1857	87th Foot	Curragh.
David Chambers McFall ..	15 Sept. 1857	34th Foot	Bengal.
Geo. Davidson Milne, M.D.	15 Sept. 1857	Royal Artillery ..	Chatham.
Alex. Thorburn McGowan	15 Sept. 1857	Staff	Chatham.
James Laudale, M.D. ..	15 Sept. 1857	92nd Foot	Bengal.
William Silver Oliver, M.D.	15 Sept. 1857	4th Bat., 60th Rifles..	Canada.
Alex. Watt Beveridge, M.D.	15 Sept. 1857	Staff	China.
John Henry Beath, M.D...	15 Sept. 1857	Staff	China.
William Ashton, M.B. ..	15 Sept. 1857	Staff	Birr.
William James Mullan ..	15 Sept. 1857	Staff	Shorncliffe.
George Whitla	15 Sept. 1857	Royal Artillery ..	Dublin.
Robert Heard, M.D.	15 Sept. 1857	67th Foot	China.
Alexander Neill	15 Sept. 1857	65th Foot	New Zealand.
Eugene McShane	15 Sept. 1857	Staff	
James Marmaduke Taylor..	15 Sept. 1857	Royal Artillery ..	Dover.
Joseph Richard Kehoe ..	15 Sept. 1857	2nd Bat., 16th Foot..	Canada.
Henry Carden Herbert ..	15 Sept. 1857	85th Foot	Cape.
Edward L'Estrange, M.D...	15 Sept. 1857	Cape Mounted Rifles	C. of G. Hope.
Robert Owen Hayden ..	15 Sept. 1857	3rd Bat., 60th Rifles	London.
Robert Walter Clifton ..	28 Sept. 1857	Royal Artillery ..	Sheerness.
Decimus F. de Hodgson, M.D.	28 Sept. 1857	Royal Artillery ..	Woolwich.
David Shorter Skinner ..	28 Sept. 1857	92nd Foot	Bengal.
Frederick William Wade ..	28 Sept. 1857	3rd Bat., 60th Rifles	London.
Charles Mackinnon	28 Sept. 1857	Staff	Aldershot.
James Good	3 Oct. 1857	43rd Foot	Bengal.
John Henderson Whittaker	3 Oct. 1857	69th Foot	Birmah.
Henry Foljambe Paterson..	19 Oct. 1857	Royal Artillery ..	Bengal.
Robert David Burn, M.D...	19 Oct. 1857	Royal Artillery ..	Bengal.
Melville George Jones ..	19 Oct. 1857	Royal Artillery ..	Quebec.
Robert Sutherland	19 Oct. 1857	1st Bat., 24th Foot ..	Aldershot.
Henry Patrickson Gregory	19 Oct. 1857	81st Foot	Bengal.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station.
Francis Madden	19 Oct. 1857	69th Foot	Madras.
James Inkson, M.D.	19 Oct. 1857	80th Foot	Bengal.
John Gordon Grant	19 Oct. 1857	48th Foot	Bengal.
Daniel Murray, M.D.	19 Oct. 1857	Staff	Gibraltar.
Walter John	9 Nov. 1857	Staff	Bengal.
James Jameson, M.D.	9 Nov. 1857	47th Foot	Canada.
John Warren	9 Nov. 1857	59th Foot	Dover.
William Tanner	9 Nov. 1857	Royal Artillery	Shorncliffe.
Henry Cole Peppin	9 Nov. 1857	Staff	Corfu.
George Bouchier	9 Nov. 1857	93rd Foot	Bengal.
Chas. Bartholomew Mathew	9 Nov. 1857	54th Foot	Bengal.
James Doran, M.D.	9 Nov. 1857	Staff	Gravesend.
Byng Thomas Giraud, M.D.	9 Nov. 1857	31st Foot	China.
Jas. Whinyates George Allen	12 Nov. 1857	99th Foot	China.
Edward Brock	8 Dec. 1857	Staff	Madras.
William Sly	8 Dec. 1857	34th Foot	Bengal.
John T. M. Symons, M.D.	8 Dec. 1857	Royal Artillery	Woolwich.
Michael Quinlan	8 Dec. 1857	2nd Bat., 7th Foot	Gibraltar.
Robert Thomas Scott	8 Dec. 1857	73rd Foot	Plymouth.
William Gerard Don, M.D.	22 Jan. 1858	28th Foot	Bombay.
William Cathcart Boyd	22 Jan. 1858	Staff	Bengal.
John Sarsfield Comyn	22 Jan. 1858	Royal Artillery	Corfu.
James McCrevey, M.D.	22 Jan. 1858	66th Foot	Madras.
Charles Henry Leet	22 Jan. 1858	Staff	Dublin.
Edward Barrett Kearney	22 Jan. 1858	Staff	Curragh.
William Hillman	22 Jan. 1858	Staff	Sheerness.
Ebenezer Miller, M.D.	22 Jan. 1858	2nd Bat., 4th Foot	Cephalonia.
William Jay	22 Jan. 1858	2nd Bat., 8th Foot	Gibraltar.
Theo. Featherstone Langstaff	22 Jan. 1858	Staff	Bengal.
Alexander Macintyre, M.D.	22 Jan. 1858	2nd Bat., 11th Foot	C. of G. Hope.
Nicholas Loftus Gray	22 Jan. 1858	2nd Bat., 13th Foot	Mauritius.
Thomas Bennett	22 Jan. 1858	2nd Bat., 14th Foot	New Zealand.
Richard W. Saunders, M.D.	22 Jan. 1858	1st Bat., 16th Foot	Canada.
Edward Coffey	22 Jan. 1858	2nd Bat., 15th Foot	Malta.
James Mackay, M.D.	18 Feb. 1858	Royal Artillery	Shoeburyness.
Wm. Henry Pickford, M.B.	19 Feb. 1858	2nd Bat., Gren. Gds.	London.
Walter B. Ramsbotham, M.B.	10 Mar. 1858	Staff	Colchester.
Donald Macpherson	10 Mar. 1858	2nd Bat., 19th Foot	Newry.
Edward Hardinge	10 Mar. 1858	Royal Artillery	Bombay.
William Curran	10 Mar. 1858	88th Foot	Bengal.
James Hinton	10 Mar. 1858	Staff	Malta.
John Anderson, M.B.	10 Mar. 1858	Staff	Stirling.
James Davis	10 Mar. 1858	57th Foot	New Zealand.
John Henry Hunt	10 Mar. 1858	Staff	Canada.
Isaac Hoysted	10 Mar. 1858	1st Bat., 8th Foot	Sheffield.
Charles Hervé Giraud	10 Mar. 1858	Staff	
George Ralph Tate, M.D.	10 Mar. 1858	Royal Artillery	Hong Kong.
John Atkinson	10 Mar. 1858	5th Dragoons	Norwich.
Hugh Deane Massy	10 Mar. 1858	Staff	Birr.
Francis Henry Preston	10 Mar. 1858	Staff	Malta.
Robert Spence	24 Mar. 1858	Staff	Bengal.
John Collins, M.D.	25 Mar. 1858	Staff	Bengal.
William Isaac Spencer	22 April 1858	2nd Bat., 18th Foot	Parkhurst.
Henry Knaggs	22 April 1858	Cape Mounted Rifles	C. of G. Hope.
Charles Gray	22 April 1858	Staff	Chichester.
John McKinnel, M.D.	22 April 1858	Staff	Netley.
John Carlaw	22 April 1858	Staff	Aldershot.
Frederick Pennington	22 April 1858	Staff	Chatham.
James Thompson	22 April 1858	Staff	Shorncliffe.
James d'Altera	22 April 1858	Royal Artillery	Bombay.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station.
Hampden Healey Maclean	22 April 1858	Staff	Devonport.
James Paxton, M.D	22 April 1858	Staff	Canada.
Edward Hopkins	22 April 1858	71st Foot	Bengal.
John Niven..	22 April 1858	82nd Foot	Bengal.
Fran. Levison Gower Gunn	23 April 1858	Staff	
Merrick Lloyd Burrows ..	30 April 1858	Staff	W. Cst. of Afr.
FitzGerald Edward Scanlan	30 April 1858	Staff	
Albert Stan. Knight Prescott	6 May 1858	Royal Artillery ..	Montreal.
Arthur Croker	7 May 1858	Staff	Bengal.
Arthur Hen. Francis Lynch	7 May 1858	1st Bat., 12th Foot ..	New S. Wales.
William Astle Hope, M.B.	7 May 1858	Staff	
Richard Thos. Golty Catton	7 May 1858	3rd Dragoon Guards	Bombay.
John Bradshaw	7 May 1858	Staff	Gambia.
Jos. Salkeld Johnston, M.D.	7 May 1858	72nd Foot	Bombay.
Thomas Turville Gardner..	7 May 1858	90th Foot	Bengal.
Andrew Moffitt	25 May 1858	67th Foot	China.
John Colahan, M.D.	25 May 1858	2nd Bat., 24th Foot..	Mauritius.
Richard John Wm. Orton ..	25 May 1858	Staff	Aldershot.
Charles Rattray, M.D. ..	25 May 1858	Staff	
Joseph Bourke	25 May 1858	Royal Artillery ..	Devonport.
Thomas Walsh	25 May 1858	2nd Bat., 21st Foot ..	Dublin.
Peter Frederick Newland ..	25 May 1858	Staff	Mauritius.
Julius Wiles	4 June 1858	Staff	Pembroke.
John Alexander Lamb ..	22 June 1858	54th Foot	Bengal.
William White	22 June 1858	2nd Bat., 1st Foot ..	Aldershot.
Rich. Beresford Carson, M.B.	22 June 1858	Staff	Portsmouth.
William Langworthy Baker	22 June 1858	Staff	Ceylon.
Henry William Devlin ..	22 June 1858	44th Foot	Bombay.
Hugh Mackay Macbeth ..	22 June 1858	91st Foot	Madras.
Thomas Michael O'Brien ..	22 June 1858	95th Foot	Bombay.
Horatio Scott	22 June 1858	Staff	Melbourne.
John Henry Halhed Tothill	22 June 1858	Staff	Chatham.
George Alex. Moorhead ..	22 June 1858	66th Foot	Madras.
Joseph Edward O'Loughlin	5 Aug. 1858	Staff	Gibraltar.
James Henry Jeffcoat ..	5 Aug. 1858	1st Bat., 9th Foot ..	Corfu.
Frederic Murray Chalk ..	5 Aug. 1858	Staff	Corfu.
Francis Roberts Hogg, M.D.	5 Aug. 1858	Royal Artillery ..	Sheerness.
John Mackenzie, M.D. ..	5 Aug. 1858	Staff	Cork.
John Davidge	5 Aug. 1858	Staff	Bengal.
John Kinahan	5 Aug. 1858	44th Foot	Bombay.
James Geo. Stewart Mathison	5 Aug. 1858	Staff	Belfast.
Samuel Argent	5 Aug. 1858	Staff	Devonport.
Samuel Archer	5 Aug. 1858	98th Foot	Bengal.
James Wilson, M.B.	5 Aug. 1858	2nd Bat., 3rd Foot ..	Gibraltar.
Walter Crisp	5 Aug. 1858	Staff	Templemore.
Edward Acton Gibbon ..	1 Sept. 1858	Staff	Gibraltar.
Robert Cardiff Crean.. ..	1 Sept. 1858	Royal Artillery ..	Woolwich.
Robert Gillespie, M.D. ..	1 Sept. 1858	74th Foot	Madras.
Austin Jonas Ferguson ..	1 Sept. 1858	Staff	Mauritius.
John Robinson	22 Sept. 1858	Royal Artillery ..	China.
St. John Killery..	22 Sept. 1858	Staff	Canada.
Edward O'Connell	22 Sept. 1358	Staff	Athlone.
Lancelot Andrews White	22 Sept. 1858	Ceylon Rifles ..	Ceylon.
William Holmes..	22 Sept. 1858	Staff	Dublin.
Edmond Hoile, M.D. ..	22 Sept. 1858	Staff	Aberdeen.
Thomas Alex. C. Macarthur	22 Sept. 1858	Staff	Canterbury.
William Alex. Gardiner ..	22 Sept. 1858	Staff	West Indies.
Mathew Lawrence White ..	22 Sept. 1858	1st Bat., 1st Foot ..	Madras.
Richard White	22 Sept. 1858	1st Bat., 23rd Foot ..	Bengal.
William Graves	22 Sept. 1858	Royal Artillery ..	Gibraltar.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station.
Tobias Barnwell	22 Sept. 1858	Staff	Bengal.
William Venour	22 Sept. 1858	46th Foot	Bengal.
Charles Benjamin Mosse ..	8 Oct. 1858	Staff	Curragh.
Langer Carey, M.D.	13 Oct. 1858	Royal Artillery ..	Montreal.
John Stuart	13 Oct. 1858	2nd Bat., 13th Foot ..	Mauritius.
Joseph Vavasour Lane ..	13 Oct. 1858	2nd Bat., 4th Foot ..	Cephalonia.
George Forbes Adams ..	13 Oct. 1858	Staff	China.
Alexander Richmond	13 Oct. 1858	Royal Artillery ..	Bengal.
Thomas Walsh	13 Oct. 1858	Staff	Dublin.
Francis Alfred Turton ..	13 Oct. 1858	1st Bat., 23rd Foot ..	Bengal.
George Scott Davie, M.D...	1 Nov. 1858	79th Foot	Bengal.
John Montgry. Fiddes, M.D.	1 Nov. 1858	Royal Artillery ..	Gibraltar.
Francis Edward McFarland	1 Nov. 1858	77th Foot	Bengal.
Thomas Ramsay	1 Nov. 1858	Staff	Ceylon.
William Temple, M.B. ..	1 Nov. 1858	Royal Artillery ..	New Zealand.
Wm. Kippen Stewart, M.D.	1 Nov. 1858	Staff	Stirling.
Patrick Barret Kearney ..	1 Nov. 1858	1st West India Reg...	Barbadoes.
Henry Harrison	16 Nov. 1858	Royal Artillery ..	Canada.
James Martin	16 Nov. 1858	Staff	Canada.
William Everet	16 Nov. 1858	Staff	
James Winterscale Lougheed	16 Nov. 1858	56th Foot	Bombay.
Andrew Thomas Carberry ..	16 Nov. 1858	2nd Bat., 14th Foot ..	New Zealand.
Robert Austen Allen	23 Nov. 1858	71st Foot	Bengal.
Benjamin Burland, M.B. ..	1 Dec. 1858	Royal Artillery ..	Bermuda.
Alfred Lewer	1 Dec. 1858	Royal Artillery ..	Madras.
Thomas Hession	1 Dec. 1858	70th Foot	New Zealand.
Edwin Wilkes	1 Dec. 1858	Staff	Shorncliffe.
George Edward Gascoyen ..	1 Dec. 1858	Staff	Canada.
Alexander Mackay	1 Dec. 1858	Staff	Chatham.
James Clerk Rattray, M.D.	8 Dec. 1858	1st Bat., 25th Foot ..	Malta.
William Robert Kerans ..	14 Dec. 1858	99th Foot	China.
Edward Litton Low, M.B.	14 Dec. 1858	Staff	Jamaica.
Robert Lindsay, M.B. ..	14 Dec. 1858	39th Foot	Bermuda.
Thomas Murtagh	14 Dec. 1858	Staff	China.
John Greig, M.B.	14 Dec. 1858	2nd Bat., 23rd Foot ..	Malta.
George Park, M.D.	14 Dec. 1858	52nd Foot	Bengal.
James Shand Duncan, M.D.	14 Dec. 1858	81st Foot	Bengal.
Richard Henry	14 Dec. 1858	91st Foot	Madras.
Robert Muir Gilchrist, M.D.	14 Dec. 1858	Staff	Aberdeen.
Edmund Thomas Palmer ..	12 Jan. 1859	Royal Artillery ..	New Brunsw.
Charles William Griffith ..	12 Jan. 1859	Royal Artillery ..	Woolwich.
Alexander Allan, M.D. ..	12 Jan. 1859	2nd Bat., 17th Foot ..	Canada.
Robert Farquharson, M.D. ..	12 Jan. 1859	2nd Bat., Cold. Gds.	London.
Hunt Johnson Bailey ..	12 Jan. 1859	Staff	Chatham.
Henry Walker	12 Jan. 1859	Staff	Templemore.
William Hensman	12 Jan. 1859	Staff	Pembroke.
Charles Edmund Wikeley ..	12 Jan. 1859	1st Bat., 19th Foot ..	Bengal.
Arthur Sanderson	12 Jan. 1859	Staff	
William Armstrong	12 Jan. 1859	Staff	Buttevant.
Alex. Campbell McTavish ..	12 Jan. 1859	3rd Bat., 60th Rifles	Wellingt. Bks.
George Arthur Grant	12 Jan. 1859	Royal Artillery ..	Madras.
John Smeeton Allanby, M.D.	1 Feb. 1859	95th Foot	Bombay.
George Calvert	1 Feb. 1859	Staff	
Thomas Seward, M.D. ..	1 Feb. 1859	Staff	Mauritius.
James Watson	1 Feb. 1859	Staff	Colchester.
James Edward Clark	1 Feb. 1859	2nd Bat., 22nd Foot ..	Malta.
James Dow Sainter	1 Mar. 1859	Staff	Bengal.
Edwin Granville Ley, M.D.	1 Mar. 1859	1st Bat., 21st Foot ..	Barbadoes.
Edward Corrigan Markey ..	1 Mar. 1859	2nd Bat., 25th Foot ..	Edinburgh.
Hammerton Crump, M.D.	1 Mar. 1859	Staff	

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station.
William Millar	1 Mar. 1859	Staff	Hounslow.
Hunter Alexander Coghlan	1 Mar. 1859	1st Bat., 18th Foot	Madras.
King John Parr	1 Mar. 1859	1st West India Reg.	Barbadoes.
William Orr	1 Mar. 1859	1st Bat., 18th Foot	Madras.
Edward Parsonage, M.D.	1 Mar. 1859	64th Foot	Aldershot.
Joseph William Carter Neynoe Murphy	1 Mar. 1859	75th Foot	Devonport.
Hen. S. Ed. Schroeder, M.D.	1 Mar. 1859	Staff	Chatham.
Geo. Carson Gribbon, M.B.	20 April 1859	Staff	Malta.
George Cardell	20 April 1859	3rd West India Reg.	Jamaica.
James Land, M.D.	20 April 1859	Staff	Queenstown.
Morgan Stanis. Grace, M.D.	20 April 1859	Staff	New Zealand.
Charles Edward Smith, M.D.	20 April 1859	Staff	C. of G. Hope.
Alexander Jennings, M.D.	20 April 1859	Staff	C. of G. Hope.
Charles Wyat Watling	20 April 1859	Staff	C. of G. Hope.
Maurice Tracey	20 April 1859	Staff	C. of G. Hope.
George Simon	20 April 1859	Staff	Madras.
Florence Theobald McCarthy	20 April 1859	1st Bat., 23rd Foot	Bengal.
Robert Tate, M.D.	20 April 1859	Staff	C. of G. Hope.
Sidney Keyworth Ray	20 April 1859	Staff	C. of G. Hope.
George Abraham Davidge	20 April 1859	1st West India Reg.	Barbadoes.
Valentine Maher	20 April 1859	Staff	
Alexander Edward Bartlet	20 April 1859	Royal Artillery	Malta.
Robert Storey	20 April 1859	Royal Artillery	Victoria, N S W
John Adsetts	13 June 1859	Royal Artillery	Jamaica.
Edward Harford Lloyd, M.B.	13 June 1859	Staff	Nova Scotia.
James Young Donaldson	13 June 1859	100th Regiment	Gibraltar.
Oliver Codrington	13 June 1859	68th Foot	Madras.
Edwin Drew	13 June 1859	Staff	Bombay.
John Adcock, M.D.	13 June 1859	1st Bat., 22nd Foot	Malta.
Howison Y. Howison, M.D.	13 June 1859	Staff	Chelsea Hosp.
George Frederick Spry	13 June 1359	Staff	Portsmouth.
John Thomas Milburn	13 June 1859	Staff	Canada.
John Alfred Illingworth	13 June 1859	Staff	Bengal.
Robert Alex. Peter Grant	13 June 1859	43rd Foot	Bengal.
Arthur Herbert Orpen	13 June 1859	Staff	Bombay.
Alexander Thomson, M.D.	13 June 1859	Staff	New Zealand.
James A. B. Horton, M.D.	5 Sept. 1859	Staff	Gold Coast.
Wm. Brough. Davies, M.D.	5 Sept. 1859	Staff	Gold Coast.
Arthr. Bowen Richards Myers	25 Sept. 1859	1st Coldstream Gds.	Windsor
James Tulloch Tulloch, M.D.	11 Oct. 1859	42nd Foot	Bengal.
Arthur Charles Gaye	11 Oct. 1859	1st Bat., 4th Foot	Bombay.
Wm. Evelyn Alston, M.D.	11 Oct. 1859	Staff	
Joseph Sumpner Joyner	11 Oct. 1859	89th Foot	Bengal.
John Alexander Scott	11 Oct. 1859	Staff	Bengal.
Arnold Royle	11 Oct. 1859	44th Foot	Bombay.
William Dumville Smythe	11 Oct. 1859	Royal Artillery	Canterbury.
Thomas Wood, M.D.	11 Oct. 1859	Staff	Dover.
James Bell Jardine	11 Oct. 1859	1st Bat., 4th Foot	Bombay.
John E. Stewart, M.D.	11 Oct. 1859	Staff	Ceylon.
Henry Cramer Guinness	11 Oct. 1859	Staff	
Alex. Oswald Cowan, M.D.	11 Oct. 1859	Royal Artillery	Bengal.
James Samuel Currie Collier	11 Oct. 1859	Staff	Ceylon.
William Creagh	15 Oct. 1859	Royal Artillery	Aldershot.
Benjamin Hinde	22 Dec. 1859	Staff	Gambia.
Austin Bruen	19 Jan. 1860	Staff	Madras.
Francis Falwasser	19 Jan. 1860	Staff	China.
Robert Waters, M.D.	19 Jan. 1860	Staff	Jamaica.
John Butler Hamilton, M.B.	19 Jan. 1860	3rd West India Reg.	Jamaica.
Edward Denham Tomlinson	19 Jan. 1860	Staff	New Zealand.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station..
John James Chappell, M.D.	19 Jan. 1860	2nd Dragoon Guards	Bengal.
Matthew Jas. E. Fagan, M.D.	19 Jan. 1860	46th Foot	Bengal.
William Cherry	19 Jan. 1860	1st Bat., 14th Foot ..	Jamaica.
Samuel Edward Maunsell..	19 Jan. 1860	97th Foot	Bengal.
William Traill, M.D... ..	19 Jan. 1860	91st Foot	Madras.
Nicholas Avent	19 Jan. 1860	66th Foot	Madras.
William Christy Robinson..	19 Jan. 1860	34th Foot	Bengal.
John Wales	19 Jan. 1860	2nd West India Reg.	Bahamas.
Joseph Francis Ashby ..	19 Jan. 1860	Staff	West Indies.
James Robert Gaussen, M.B.	19 Jan. 1860	Staff	Corfu.
John Livingston Power ..	19 Jan. 1860	Staff	Bengal.
Patrick Walter Stafford ..	19 Jan. 1860	56th Foot	Bombay.
Thomas Henry White, M.D.	19 Jan. 1860	80th Foot	Bengal.
Thomas Quinlan	19 Jan. 1860	33rd Foot	Bombay.
Owen Owen	19 Jan. 1860	Staff	
James Ferguson..	19 Jan. 1860	Staff	Jamaica.
Edward James Boulton ..	19 Jan. 1860	2nd West India Reg.	Bahamas.
George Elmsley Will.. ..	19 Jan. 1860	Staff	New Zealand.
John Richard Thomas ..	17 July 1860	Staff	
Chas. Henry Young Godwin	1 Oct. 1860	38th Foot	Bengal.
John Walters, M.B.	1 Oct. 1860	1 Bat., Rifle Brigade	Canada.
Franklin Gillespie, M.D. ..	1 Oct. 1860	35th Foot	Bengal.
Albert Augustus Gore, M.D.	1 Oct. 1860	Staff	
Thomas Maunsell	1 Oct. 1860	48th Foot	Bengal.
George Farr White	1 Oct. 1860	77th Foot	Bengal.
Fred. Robert Wilson, M.B.	1 Oct. 1860	1 Bat., 20th Foot ..	Bengal.
Nathaniel Alcock	1 Oct. 1860	35th Foot	Bengal.
Donald M. Davidson, M.D.	1 Oct. 1860	35th Foot	Bengal.
Robert Edward Heath, M.D.	1 Oct. 1860	88th Foot	Bengal.
Robert Adams, M.D... ..	1 Oct. 1860	81st Foot	Bengal.
Reginald Croft Lever, M.B.	1 Oct. 1860	7th Hussars	Bengal.
Bronislaw J. Jazdowski, M.B.	1 Oct. 1860	93rd Foot	Bengal.
James Thompson	1 Oct. 1860	4th West India Reg.	Sierra Leone.
Caleb Sherar Wills	1 Oct. 1860	83rd Foot	Dover.
Robert De Burgh Riordan	1 Oct. 1860	38th Foot	Bengal.
Thomas Young Baker ..	1 Oct. 1860	27th Foot	Bengal.
John Henry Bracken.. ..	1 Oct. 1860	54th Foot	Bengal.
Patrick Quinlan..	1 Oct. 1860	90th Foot	Bengal.
Frank Pout..	1 Oct. 1860	Staff	Bengal.
Patrick Charles Baxter, M.B.	1 Oct. 1860	93rd Foot	Bengal.
Samuel Gamble White, M.D.	1 Oct. 1860	Staff	Ceylon.
Henry Lamb	1 Oct. 1860	50th Foot	Ceylon.
Henry Offley Harvey.. ..	1 Oct. 1860	Staff	West Indies.
Erskine Burnett Grant, M.D.	1 Oct. 1860	4th West India Reg.	West Indies.
William Robert Wall ..	1 Oct. 1860	18th Hussars ..	Hounslow.
Thomas Pattison Flynn ..	1 Oct. 1860	4th West India Reg.	West Indies.
Charles Hamilton Harvey..	1 Mar. 1861	Staff	
Alexander Long	1 Mar. 1861	Staff	
Augustus Fred. Elliot, M.D.	1 Mar. 1861	Staff	
John Waring Belcher, M.D.	1 April 1861	Staff	Bombay.
Francis Henry Welch ..	1 April 1861	Staff	Malta.
Robert Batho	1 April 1861	Staff	C. of G. Hope.
William Ironside, M.D. ..	1 April 1861	71st Foot	Bengal.
Francis Patrick Staples ..	1 April 1861	19th Foot	Bengal.
Joseph John Pope	1 April 1861	72nd Foot	Bombay.
Joseph Augustin Fitzpatrick	1 April 1861	1 Bat., 1st Foot ..	Madras.
William Hill Climo, M.D...	1 April 1861	Rifle Brigade ..	Bengal.
Wm. James Wilson, M.D.	1 April 1861	28th Foot	Bombay.
Usher Beere Eaton, M.D...	1 April 1861	Staff	Gambia.
John Greig, M.D.	1 April 1861	2nd West India Reg.	Bahamas.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.	Station.
Walter Nethercoat Pell ..	1 April 1861	Rifle Brigade.. ..	Bengal.
Alf. F. Stafford Clarke, M.D.	1 April 1861	42nd Foot	Bengal.
Augustus Robinson Hall ..	1 April 1861	52nd Foot	Bengal.
James Watt, M.D.	1 April 1861	Staff	Bombay.
Edward Footner..	1 April 1861	Staff	Bombay.
Henry Stewart Lodge, M.B.	1 April 1861	2nd Bat., 2nd Foot ..	Gibraltar.
John Ross Murray, M.D...	15 June 1861	Staff	Bengal.
Frank Simpson	1 Aug. 1861	Staff	
Edward McCarthy	20 Mar. 1862	Staff	Gambia.
Thomas Parker Smith, M.B.	31 Mar. 1862	Staff	Bengal.
John Dustan	31 Mar. 1862	Staff	Bengal.
John Elliott	31 Mar. 1862	Staff	Madras.
Acheson Geo. Bartley, M.D.	31 Mar. 1862	Staff	Bengal.
Henry Frank Hewsman ..	31 Mar. 1862	Staff	Bengal.
William James Tyrrell ..	31 Mar. 1862	Staff	Madras.
John Barlow Hannah, M.D.	31 Mar. 1862	Staff	Bengal.
William Pile, M.B.	31 Mar. 1862	Staff	Bengal.
Thomas Cecil Morgan ..	31 Mar. 1862	Staff	Madras.
Richard Patrick Ferguson..	31 Mar. 1862	Staff	Bengal.
Thomas Dodd Milburn ..	31 Mar. 1362	Staff	Madras.
Alex. Ferrier Churchill, M.D.	31 Mar. 1662	Staff	Madras.
John Stannard McAdam ..	31 Mar. 1862	Staff	Madras.
Edward Nicholson	31 Mar. 1862	Staff	Madras.
Richard Jones Owen, M.D.	31 Mar. 1862	Staff	Madras.
Samuel Rowe	16 April 1862	Staff	Sierra Leone.
Alfred John Bellmore ..	16 April 1862	Staff	Gold Coast.
Allan Nesbitt Fox	16 April 1862	Staff	Gambia.
Wm. Nelson Duggan, M.D.	27 May 1862	Staff	Gambia.
Joseph Gray	28 Aug. 1862	Staff	Gold Coast.
Robt. William Hooper, M.D.	2 Sept. 1862	Staff	Gold Coast.
Gideon Rutherford, M.D.	9 Dec. 1862	Staff	Gambia.
John Sandison	17 Mar. 1863	Staff	Gambia.

ROYAL MALTA FENCIBLE ARTILLERY.

Surgeon.—Ludovico Bernard, M.D. .. .. 9th May 1849.
Assistant-Surgeon.—Carmelo Ellul, M.D. .. 9th Aug. 1849.

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